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World Trade and the Implications of Tariff Reductions for the United States Walnut Industry

KENNETH R. FARRELL

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by

Kenneth R. Farrell[1/]

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SUMMARY

Shelled walnuts are one of a comparatively small number of agricultural products for which United States tariff reductions may be sought in the multilateral trade negotiations to be conducted in 1964 under the auspices of GATT. France, Italy, Turkey, Yugoslavia, and India, all members of GATT, account for 50 percent of the world commercial production of walnuts. United States imports of shelled walnuts from these countries totaled 6.4 million pounds and were valued at $3.1 million in 1962.

World production of walnuts has increased moderately during the past 15 years to a record high of 183,000 tons in 1962. Production of walnuts in the United States, after undergoing a pronounced increase in the period 1924-1946, has leveled off within a general range of 70,000 to 80,000 tons per year since the end of World War II. About 95 percent of United States walnut production is in California; the remainder is produced in the states of Oregon and Washington. As production in other countries increased, the relative importance of United States production has declined from an average of nearly 54 percent of world production in 1948-1952 to an average of 47 percent in 1958-1961 and 44 percent on the basis of preliminary production data for 1962.

From a long-run viewpoint, United States imports of in-shell and shelled walnuts have declined sharply. Imports of in-shell walnuts, which averaged nearly 25 million pounds per year in the early 1920's and 2.3 million pounds in the mid-1930's, have totaled less than 100,000 pounds in most years since the end of World War II. Imports of shelled walnuts averaged 17 million pounds in the early 1920's and 8.4 million pounds in the mid-1930's and during the past few years have ranged between 3.3 and 7.0 million pounds per year. The secular decline in walnut imports is inversely correlated with commercial development of the United States walnut industry. In the 1920's and early 1930's, the domestic industry was in its commercial infancy. Although domestic production was increasing, average annual production in the early 1930's was only slightly more than 50 percent of the average production in 1958-1961. Then, as United States production continued to increase through World War II, as commercial shelling of walnuts increased, and as the industry adopted standards insuring uniformity of product characteristics and developed advertised brands for in-shell walnuts, imported walnuts, particularly in-shell, were gradually displaced in the American market.

However, displacement of imports has been much more complete in the case of in-shell walnuts than for shelled walnuts. Throughout the postwar period, imports of in-shell walnuts have constituted only a minute proportion of United States in-shell walnut production. But, imports of shelled walnuts, though variable in volume from year to year, have continued in substantial absolute volume and relative to total United States consumption of shelled walnuts. Since 1947, the smallest volume of shelled walnuts imported was 2.7 million pounds in 1948-49; the greatest volume was 11.9 million pounds in 1955-56. During the past four marketing seasons, consumption of imported shelled walnuts has ranged from 9 to 19 percent of the apparent total annual consumption of all shelled walnuts in the United States.

United States exports of walnuts, consisting principally of in-shell nuts, has declined from an average annual volume of 3.6 million and 4.7 million pounds (shelled equivalent basis) in 1930-1934 and 1935-1939, respectively, to 1.4 million pounds in 1948-1952. Apart from the marketing season of 1958-59, when a large quantity of in-shell walnuts was exported under the operation of the federal walnut marketing order, exports in recent years have ranged from 1.0 million to 1.5 million pounds (shelled equivalent basis). Total exports of walnuts now represent only 2 to 3 percent of annual United States walnut production; exports of shelled walnuts represent only a minute proportion of annual United States production of that product. Clearly, the domestic industry has become highly dependent upon the American market for disposition of supplies.

In contrast with the indigenous market dependency of the United States walnut industry, most of the other commercial walnut-producing nations of the world for which data are available have been consistently highly dependent upon export markets for disposition of supplies. France, Italy, Turkey, and India have exported annually a volume of walnuts equivalent to two-thirds or more of their annual production of walnuts during the 1950's. Interseasonal carry-over of walnuts in those countries has been very small throughout the decade of the 1950's. Thus, annual production of walnuts appears to be an important determinant of the total export volume of foreign nations.

In addition to changes in the aggregate volume of shelled walnuts imported annually into the United States, marked changes have occurred in the relative importance of various nations in supplying shelled walnuts to this

country. In prewar years, France and China supplied most of the shelled walnuts imported into the United States. As a result of the United States embargo of trade with China, that country has no longer been a source of supply for the United States. The French have concentrated apparently in marketing in-shell walnuts in the expanding markets of western Europe. During the period 1948-1952, Turkey, Iran, and India supplied an average of only 28 percent of United States annual shelled walnut imports; in the 1960 and 1961 marketing seasons, they supplied nearly 75 percent of the total.

With one temporary exception, United States tariffs on in-shell and shelled walnuts have remained at the levels prescribed in the Tariff Act of 1930--5 cents per pound in shell and 15 cents per shelled pound. However, in relation to the value of imported walnuts, United States tariffs have decreased appreciably since the early 1930's. As the average value of imports rose, the United States tariff as a percentage of that value declined from an average of 72 and 82 percent, respectively, for in-shell and shelled walnuts in 1931-1933, to 21 and 31 percent, respectively, during the past two marketing seasons.

In addition to restraints on imports which may be provided by United States walnut tariffs, two sections of the Agricultural Marketing Agreement Act of 1937, as amended, are of relevance to the walnut industry. Section 22 provides for imposition of quotas and/or fees on imports when such imports render ineffective or materially interfere with any program initiated under the Act by the U. S. Department of Agriculture, which in this case is the federal marketing order for walnuts. To date, no action has been taken under that statute to regulate or restrict importation of walnuts. Section 8(e) of the Act requires imported walnuts to meet prevailing standards with respect to grade, size, quality, or maturity when such standards are in effect for the domestic industry under the federal marketing order. Thus far, the effects of that section on the volume of walnuts imported appear to have been minimal.

Data by which foreign production and consumption of walnuts might be projected quantitatively are either inadequate or wholly lacking. However, the longevity of bearing walnut trees; the tendency to continue harvesting of walnuts as long as prices exceed per unit variable harvesting costs, which in some developing countries may be extremely low because of low opportunity costs for the principal input, labor; and the possibilities of increasing yield through technical improvements in production methods seem to suggest

that production might be maintained, if not increased, in the remainder of this decade. Total demand for tree nuts in the major industrialized countries and areas of the world, such as Canada, Australia, and western Europe, can also be expected to increase principally as a result of projected increases in population. Demand for walnuts in those countries will of course be dependent, in part, upon the price and availability of other tree nuts.

Although the United States walnut industry has little directly at stake in the external tariff for walnuts adopted by the European Economic Community, there has been interest in this country in those tariffs because of the possible trade diversion effects which they might generate in the exports of other walnut-producing countries. The common external tariff of 8 percent, ad valorem, adopted by the Community and to become effective not later than January 1, 1967, will result in an increase in the current tariff in some member countries and a reduction in the tariff of some other of the six member nations. France and Italy, as member countries, and Turkey, as an associate member of the Community, will be placed at an advantage in the market of the "Six" relative to other suppliers such as India, Iran, and Syria. Yet, it appears that there is little likelihood of Community tariffs resulting in any substantial redirection of trade and thus indirectly affecting the volume of walnuts imported into the United States.

On balance, it appears that a reasonably well-balanced growth in foreign, non-Communist production of and demand for walnuts will occur during the remainder of this decade. If so, and barring the reentrance of China as a major walnut supplier of the non-Communist world (and a succession of large walnut crops in other countries), foreign walnut supplies available for export to the United States would probably average about the same in the next seven or eight years as in the past decade. However, based upon past performance, it is probable that there will be years of abnormally large and small production volume in particular countries. Coincidence in the direction of such annual changes among several countries could alter greatly the supplies of walnuts entering world trade and imported into the United States between successive years. It seems probable that economic problems associated with short-term instability in production, rather than the emergence of a basic imbalance in longer term rates of growth of production and demand, will be the principal ones in international trade in walnuts during the remainder of this decade.

Assuming that average yield per bearing acre equals that of the past seven years, projected increases in bearing acreage of walnuts in California indicate that production in the state by 1970 might average 10 to 11 percent higher than during the past seven years. If production in Oregon continues to average close to the levels of recent years, Pacific Coast walnut production might approach an annual average of 79,000 to 80,000 tons by 1970. That projected increase in production is approximately equal to the projected increase in demand for shelled walnuts in the United States resulting from projected increases in national population and real per capita income.

Of the many important changes which have occurred in the marketing and utilization of walnuts, two are of particular significance in this report. First, the volume of domestic shelled walnuts sold by Pacific Coast handlers has increased from an annual average of less than 5 million pounds in the middle and late 1920's to an average of approximately 32 million pounds during the past five marketing seasons. In 1957, the sales volume of shelled walnuts exceeded that of in-shell walnuts (shelled equivalent basis) for the first time. During the past five years, sales of the shelled product have constituted 53 to 58 percent of the total sales volume in shelled equivalent terms and have accounted for 50 to 55 percent of the annual gross income of Pacific Coast walnut handlers. A second significant change is the increased proportion of shelled walnuts being distributed by Pacific Coast handlers for direct consumption in households--15 percent in 1935-1937, 39 percent in 1950-1952, and perhaps as much as 50 percent currently. The proportion shipped to bakers, but particularly to confectioners, has declined accordingly. In each outlet, shelled walnuts compete with other domestically produced shelled tree nuts, particularly pecans. The major competition from shelled walnut imports is probably centered in the baking and confectionery trades.

Statistical analyses of demand for shelled walnuts in the United States during the period 1926-1961, excluding the years 1943-1946, have revealed that changes in United States annual per capita acquisition of all shelled walnuts have been associated with changes in the following variables: (1) the average annual deflated f.o.b. price of Pacific Coast shelled walnuts, (2) United States annual per capita acquisition of all in-shell walnuts, (3) United States annual per capita supply of other tree nuts, (4) United States annual per capita real disposable personal income, and (5) "trend" and "shift" variables. Combined, those variables explain about 86 percent of the annual

variation in United States per capita acquisition of all shelled walnuts. All, with the exception of per capita real disposable personal income, are correlated negatively with changes in annual per capita acquisitions of shelled walnuts.

Statistical analyses of United States imports of shelled walnuts during 1931-1961 (excluding the years 1941-1947) and for the years 1948-1961 only, have indicated that changes in United States annual per capita imports of shelled walnuts from countries other than China have been associated with changes in four variables: (1) the annual average f.o.b. price of Pacific Coast shelled walnuts, (2) annual total foreign commercial production of walnuts in countries other than China, (3) United States annual per capita imports of shelled walnuts from China, and (4) a trend variable. Combined, these four variables explain about 76 percent of the annual variation in United States per capita imports of shelled walnuts since 1948. The first two of these variables are positively correlated with changes in per capita imports; an increase in f.o.b. price or foreign commercial production is associated with an increase in per capita imports from countries other than China. The remaining two variables are negatively correlated with per capita imports from countries other than China. The negative trend variable indicates that, apart from the influence of the other three variables, United States per capita imports of shelled walnuts from countries other than China have been decreasing over time.

The foregoing analyses were employed to estimate the price and income effects of a reduction in the United States tariff for shelled walnuts of the magnitude and in the manner authorized in the Trade Expansion Act of 1962. The Act authorizes a maximum tariff reduction of 50 percent to be applied in equal installments over five successive years. Applied to shelled walnuts, the maximum total reduction would be 7.5 cents per pound or 1.5 cents per pound in each year of the five successive years.

The direct independent effects of a 1.5-cents-per-pound tariff reduction could be to increase United States imports of shelled walnuts by 222,000 pounds, lower the f.o.b. price for Pacific Coast shelled walnuts by 3.2 cents per pound, and decrease handlers gross income by about $1 million in the first year following the tariff reduction. Those estimates of impact assume that the entire tariff reduction is reflected to foreign suppliers and that the domestic industry continues to market the same supply as it would have without

tariff reduction. The estimated price and income effects are those which could ensue solely as the result of the tariff reduction under the assumptions just stated. Of course, other variables which affect price of domestic shelled walnuts and the volume of shelled walnuts imported into the United States would also be operative during the time of the tariff reduction, e.g., changes in per capita income in the United States, changes in the supply of other tree nuts in the United States, and changes in the volume of foreign walnut production. The actual price and income attained by the industry and the actual volume of shelled walnuts imported into the United States in the year of tariff reduction would be determined by the net total effects of all those simultaneously operating variables of which the tariff reduction is but one variable.

It is possible that the independent price- and income-depressing effects of the tariff reduction in the first year might be less than indicated above. If the domestic industry lowered price to meet the competition of increased imports, that, according to the statistical evidence uncovered in this report, would tend to suppress imports. Whether this would occur would depend, in part, upon how quickly adjustments were made by both domestic and foreign suppliers. Although it might be difficult to make such adjustments in a period of a year or less, it seems quite probable that over the five-year period in which tariff reductions were occurring many of the types of adjustments just described would be anticipated and would occur even if in a lagged manner. Thus, it seems improbable that the total income loss to the domestic industry over the five years would total $5 million (the first year loss multiplied by five). There is no means by which the total income losses attributable independently to the sequence of tariff reductions over five years can be estimated with any empirical precision. Subjectively, it seems possible that they might range between $4 million and $5 million to the shelled walnut sector of the industry.

In the short run, it seems likely that the impacts of a tariff reduction on shelled walnuts would fall principally upon the shelled walnut sector of the industry. Because of dissimilarities in seasonal marketing patterns, the fact that not more than 50 percent of the shelled walnuts marketed are for direct use in households and because the two product forms may have substantially different use in the household, there seems little likelihood that a reduction of 3.2 cents per pound in the f.o.b. price of shelled walnuts would

generate any substantial substitution between the two product forms. Statistical analyses have also indicated the possibility of a very low substitution ratio between shelled and in-shell walnuts (1:12). Thus, a small price reduction in shelled walnuts is not likely to result in any appreciable reduction in movement and prices of in-shell walnuts in the short run.

Until additional economic research is available, nothing can be said definitively concerning long-run demand interrelationships for the two product forms. Thus, it is not possible at this time to offer any quantitative evidence of the efficacy of attempts which the industry might make to offset losses from tariff reduction on shelled walnuts by reallocating available walnut supplies between the two product markets. The very character of use upon which in-shell walnuts are so dependent (holiday trade) suggests that demand for that product form might be more inelastic with respect to price than in the shelled form. And recent trends in per capita and total consumption of the in-shell product offer little encouragement that a substantial reallocation of supplies could be made to that outlet without substantial decreases in price.

Although statistical analyses of demand contained in this report relate to the handler or f.o.b. level of the marketing system, it seems quite probable, in view of the structure of the industry and suggestive statistical evidence, that price and income losses reflected initially at the handler level would be passed backwards to walnut producers. The single largest marketing organization in the industry is a grower-owned cooperative. Price changes experienced by the cooperative could only be passed back to its producer members, at least in the short run. Thus, it is probable that losses stemming from tariff reduction on shelled walnuts would be passed back, in large part, to walnut producers.

One of the possible "side effects" of a sequence of tariff reductions might be to induce additional variation in the volume of United States imports of shelled walnuts and, consequently, in the price of shelled walnuts at the handler level of the walnut marketing system. A tariff reduction would likely induce a series of adjustments in quantities supplied by domestic and foreign suppliers of walnuts. A sequence of reductions might induce a series of price-quantity oscillations. Such variations or the failure to anticipate correctly the timing and magnitude of sequential adjustments might compound the already appreciable inventory management problems in several parts of the

walnut marketing system. Conceivably, industry efforts to reduce interseasonal supply variations through operation of the federal marketing order could be made less effective or the objectives of such a program made more difficult and costly to attain if variability of imports was increased.

Although the short-run, independent effects of a tariff reduction of the magnitude and in the manner authorized in the Trade Expansion Act might be moderate, it is important to consider the full economic circumstances which might prevail in the industry at the time of tariff reduction. Under certain circumstances, the net total effect of all variables affecting price and income on the walnut industry could be large even while the independent effect of a tariff reduction was small. A tariff reduction, for example, at a time when imports are decreasing because of a secular decline in foreign production or when domestic demand is expanding rapidly might be more acceptable than under circumstances where imports were likely to increase even without tariff reduction or when domestic demand expansion is likely to be stultified by, for example, large supplies and low prices of competing tree nuts.

Although there is little evidence to suggest that United States imports of shelled walnuts will increase persistently during the remainder of this decade, this does not deny that in particular years shelled walnut imports will be large. Increased imports might be expected to occur in particular years when foreign production of walnuts increases and in years when the price of domestic shelled walnuts is increased. Tariff reduction of any magnitude would tend to supplement the import-increasing effects of those variables under such circumstances. Thus, the major question surrounding reduction in the tariff on shelled walnuts may not be the magnitude of its "independent" effect on the domestic industry but the possibility that the reduction might supplement the effects of other variables and thus assist in generating large net total effects upon the domestic industry. The other major concern may be that a tariff reduction might even accentuate short-term instability in imports and thus in domestic prices and income for walnuts.

Obviously, the domestic walnut industry will not gain from unilateral reduction in the United States tariff on shelled walnuts. To the individuals so affected, any uncompensated reduction in price and income may seem "unjust" or "inequitable." Questions of equity and compensatory income transfers have not been engaged in this report. This is not to deny, however, that such questions are relevant to adversely affected industries or to officials charged

with conducting trade negotiations; obviously, they are or should be of relevance to both parties. However, in the long run, variables other than tariffs are likely to prove to be more important determinants of walnut production, consumption, and trade. Much will depend upon the nature of marketing and price policies pursued by individual firms in the domestic industry and by those firms acting jointly through industry-wide marketing programs. Those policies and, particularly, the price levels sought by the industry may contribute more to the determination of the future volume of shelled walnut imports and economic conditions in the entire walnut industry than would a reduction in the United States tariff for shelled walnuts.

PART I: INTRODUCTION

On May 21, 1963, delegates to the General Agreement on Tariffs and Trade (GATT) Ministerial Conference at Geneva unanimously adopted a resolution setting forth principles and general procedures pertaining to multilateral trade negotiations to be conducted in 1964 under the auspices of GATT. Among the principles agreed upon were the following:[1/]

(1) "That the trade negotiations shall cover all classes of products, industrial and nonindustrial, including agricultural and primary products."

(2) "That the trade negotiations shall deal not only with tariffs but also with nontariff barriers."

(3) "That . . . the tariff negotiations . . . shall be based upon a plan of substantial linear tariff reductions with a bare minimum of exceptions which shall be subject to confrontation and justification."

The views of the Executive Branch of the United States government regarding the negotiating plan were expressed during the Ministerial Conference by Christian A. Herter, Special United States Representative for Trade Negotiations:[2/]

". . . we are convinced that the fundamental objective of the conference must be to bring about the greatest possible reduction in tariffs and other barriers to trade. Any plan that does not achieve such an objective is less than adequate in our view.

"It is, of course, the firm position of my government that negotiations must include agricultural products. This means that my government will not be prepared to conclude negotiations until equitable tariff and trade arrangements have been developed for agricultural products. This is necessary for the United States as a major agricultural exporting and importing nation."

Although attention has been focused upon the possible nature of negotiations between the United States and the European Economic Community (EEC), the negotiations will involve all of the member countries of GATT. Subject to certain constraints of GATT and in United States trade negotiating authority,

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1/ As reported in European Community Information Service, European Community, No. 63 (Washington, D. C., 1963), p. 2.

2/ As reported in U. S. Foreign Agricultural Service, Foreign Agriculture, Vol. I, No. 25 (June 24, 1963), p. 5.

tariff reductions effected between the United States and any other country or group of countries will be extended to all member countries of GATT.

Many important procedural details concerning the negotiations are as yet unspecified. Vital questions remain concerning the extent to which the EEC will be able and willing to negotiate on agricultural products. Yet, as indicated, a general agreement on principles which will guide the negotiations has been reached by the contracting parties. A general commitment to a reduction in tariffs and other trade barriers has been made. Statements of United States officials have indicated clearly that negotiations on agricultural products should constitute an important part of the total negotiations.

It seems probable that the EEC and several other nations will seek United States tariff reductions in nonagricultural products in return for any tariff concessions which they may grant. Many of these countries' exports to the United States are weighted heavily in favor of nonagricultural products. Yet, in the case of particular agricultural products, the United States constitutes an important export outlet for EEC and several other GATT member nations. United States tariff reductions may be sought for such products.

Walnuts is one such product. France, Italy, Turkey, Yugoslavia, and India, all of which are members of GATT, account for 50 percent of the world commercial production of walnuts. United States imports of shelled walnuts from those countries totaled 6.4 million pounds and were valued at $3.1 million in 1962.

The primary objective of this analysis is to assess the potential economic impacts which United States tariff reductions would have on the United States walnut industry. In particular, the analysis will be directed toward determining quantitatively the effects of tariff reductions upon the volume of United States shelled walnut imports, the volume of United States shelled walnuts consumed, domestic walnut prices, and gross income of the U. S. walnut industry. Because of its dominant national position, particular attention will be directed toward the California walnut industry. Related and important objectives of the analysis include:

(1) A review of trends and prospects in world production, consumption, and trade in walnuts.

(2) A review of recent changes in and the current structure of United States tariffs for walnuts.

(3) A review of economic trends and prospects in the United States walnut industry.

Relatively little of a quantitive analytical nature has been done concerning the impact of tariff adjustments on the United States walnut industry. In part, this must be attributed to the lack of relevant and accurate data, particularly with respect to foreign walnut industries. This same constraint has been encountered in this analysis.

Yet, decisions are to be made on the basis of information, data, and imperfect analyses which are available. It is to be hoped that data and analyses contained in this report will facilitate the making of more informed, well-advised decisions than might otherwise occur. The report would serve an equally important function if it indicates some types of data which need to be collected and made available on a systematic, continuing basis.

PART II: WORLD PRODUCTION, CONSUMPTION, AND TRADE: TRENDS AND PROSPECTS

Production

English walnuts are produced in large commercial volume in four widely separated areas of the world--the Mediterranean Basin, the Balkans, Southeast Asia, and the United States.

France and Italy are by far the largest producers in the Mediterranean Basin with production in each averaging about 25,000 tons in the past five years. Combined commercial production in Turkey, Iran, and Syria averaged 18,000 tons in the same period. Those five Mediterranean countries have, in total, accounted for 41 to 47 percent of the non-Communist world annual production since 1957.

The Balkan countries of Rumania, Bulgaria, and Hungary produced substantial quantities of walnuts prior to World War II. Production averaged 42,000 tons per year, about 13 percent of the average world production, during 1935-1939.[1/] Although postwar production data are not available, United States imports of shelled walnuts from Rumania have been maintained at a volume not greatly different than in 1935-1939, suggesting that production has been maintained near prewar levels at least in that country.

Average annual commercial production in India during the past five years has been estimated at 12,000 tons. Those estimates are undoubtedly subject to considerable error and may, in fact, be a better approximation of exportable walnut supplies than of commercial production. Production data for Communist China, the other major producer of Southeast Asia, are almost wholly lacking for either pre- or postwar years. One admittedly crude estimate placed Chinese production at an average of 24,000 tons annually during 1935-1939.[2/]

The United States is by far the largest single commercial walnut-producing nation in the world. Production, of which about 95 percent is in California, has averaged 75,000 tons per year since 1957. That constituted 44 to 51 percent of annual commercial production in the non-Communist world.

1/ U. S. Tariff Commission, Edible Tree Nuts, War Changes in Industry Series, Report No. 18, 1946, p. 14.

2/ Ibid.

World production has increased moderately since 1930. By 1958-1961, production had more than regained the immediate prewar level and averaged about 19 percent higher than in 1930-1934 (Table 1). During the postwar years, 1948-1962, production has trended gradually but persistently upward to a record high of 183,000 tons in 1962. Characteristic of perennial fruits, there have been wide annual variations in production in each of the three nations of major production and in the non-Communist world total of production (Figure 1).

TABLE 1

Commercial Production of Walnuts in Specified Countries and Areas of the World, Annual Average in Selected Periods and Annual, 1962

Period or year[a/]	Country or area						
	France	Italy	Other Mediterranean Basin[b/]	India	United States	World[c/]	United States as percent of world
	thousand in-shell tons						
1930-1934	39	16	17	d/	39	129	30.2
1935-1939	38	16	16	d/	57	148	38.5
1948-1952	21	22	20	d/	77	144	53.5
1953-1957	23	20	19	10	70	142	49.3
1958-1961	24	23	22	12	73	154	47.4
1962e/	31	36	23	12	81	183	44.3

a/ Crop year in respective countries.

b/ Yugoslavia, Turkey, Syria, and Iran.

c/ Sum of production in specified non-Communist countries.

d/ No data available.

e/ Preliminary.

Source: Appendix Table 1.

United States walnut production has almost doubled since the early 1930's. The period 1930-1946, in particular, was one of rapid expansion for the American industry. In the postwar period, however, production has leveled off within a general range of 70,000 to 80,000 tons per year, but with continued and

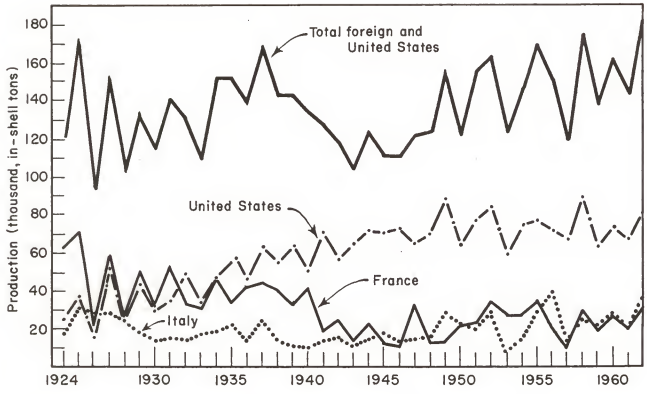

Figure 1. Commercial Production of Walnuts in Selected Countries, 1924-1962

Sources: Table 1 and Appendix Table 1.

substantial year-to-year variation. In relation to world production, United States output rose from 30 percent in 1930-1934 to a five-year average of 53 percent in 1948-1952. Thereafter, its relative importance has declined slightly to 47 percent in 1953-1957 and 44 percent on the basis of preliminary production data for 1962.

In contrast to the comparative stability of production in the United States since 1948, walnut production in some other parts of the world has been increasing. French production, although still well below prewar levels, has increased 14 percent between 1948-1952 and 1958-1961. Italian production increased 5 percent during the same period and in 1958-1961 averaged 44 percent higher than 1930-1934. Aggregate production in Yugoslavia, Turkey, Syria, and Iran has followed the same general trend. Indian production averaged 2,000 tons per year higher in 1958-1961 than in the mid-1950's.

Consumption and Trade

Several changes of importance to the United States walnut industry have occurred in world trade during the past 40 years:

(1) The volume of United States imports of walnuts, both in-shell and shelled, has declined sharply.

(2) There has been a marked change in the composition of United States walnut imports. Virtually all imports since the end of World War II have entered in shelled form.

(3) The relative importance of various nations supplying walnuts to the United States has changed appreciably. Imports from China, which constituted a large part of the total prior to World War II and as late as 1950-51, have been prohibited by a United States embargo of trade with China. India has become an important supplier of shelled walnuts only since 1947 but particularly in the past three years.

(4) The United States walnut industry has become increasingly dependent upon domestic markets for disposition of supplies. United States exports of in-shell walnuts have declined sharply in volume since 1932. Exports of shelled walnuts, always very small in volume, now represent a minute part of United States total commercial shelled walnut production.

United States imports of walnuts in the 1920's averaged 26 million pounds per year in shelled equivalent terms (Table 2). That was a period of commercial infancy for the domestic industry. The comparatively small volume of walnuts produced in this country was marketed almost exclusively as in-shell

nuts. Shelling was confined principally to culls and blows, by-products of the process of preparing walnuts for in-shell markets. Accordingly, virtually the entire supply of shelled walnuts and a relatively large part of the supply of in-shell walnuts available for consumption in the United States was composed of imports.

TABLE 2

United States Exports and Imports of Walnuts, Annual Average in Selected Periods and Annual, 1958-1961

Period or year[a]	Exports			Imports		
	In-shell	Shelled	Total shelled equivalent[b]	In-shell	Shelled	Total shelled equivalent[c]
	thousand pounds					
1920-1924	[d]			24,902	17,112	26,824
1925-1929				16,913	19,035	25,631
1930-1934	8,644[e]		3,630	2,286	8,354	9,246
1935-1939	11,232		4,717	160	4,416	4,478
1948-1952	3,078	132	1,425	60	5,860	5,883
1953-1957	4,644	117	2,067	14	6,900	6,905
1958	10,237	1,074	5,374	57	3,301	3,323
1959	3,211	183	1,532	102	5,384	5,424
1960	2,227	164	1,099	72	6,926	6,954
1961	1,924	232	1,040	45	3,722	3,740

a/ Year beginning August 1.

b/ In-shell converted at shelling rate of 42 percent plus shelled.

c/ In-shell converted at shelling rate of 39 percent plus shelled.

d/ Blanks indicate no data available.

e/ Average, 1932-1934. Exports prior to 1932 were negligible.

Sources: Appendix Tables 2-4.

By 1939, domestic production had increased substantially. Although the volume of walnuts shelled was small in relation to that of today, the output had increased rapidly between 1930 and 1939.[1] As a result of these developments and because of a severe decline in economic activity, the United States imports of walnuts declined to an average of 4.5 million pounds, shelled equivalent, in 1935-1939. That was 83 percent less than the annual average imports in 1920-1924. Imports of in-shell walnuts, which averaged 25 million pounds and constituted 26 percent (shelled equivalent) of all walnuts imported in 1920-1924, dropped precipitously to an average of 160,000 pounds and represented only 1 percent of total imports in 1935-1939. The volume of shelled imports declined relatively less (74 percent) but, nevertheless, substantially during these two decades.

During the years 1942-1947, few or no walnuts were imported as a result of World War II and its aftermath. However, by 1949, large quantities of shelled walnuts were again being imported. In the five years 1948-1952, imports, almost exclusively shelled, had attained an average annual level of 5.9 million pounds, almost one-third greater than in the years just prior to the war. Having attained that level, there has been no distinct trend in the volume of imports over the 14 years 1948-1961 (Figure 2).

The most apparent aspect of shelled walnut imports since 1948 is the wide variation in volume--from a low of 2.7 million in 1948 to a high of 11.9 million pounds in 1955.

United States exportation of walnuts, consisting principally of in-shell nuts, has trended downward sharply from an average annual volume of 3.6 and 4.7 million pounds (shelled equivalent) in 1930-1934 and 1935-1939, respectively (Table 2). By 1948-1952, export volume had declined to 1.3 million pounds on a kernel-weight basis. In the ensuing years, in-shell export volume has followed no particular trend but has been characterized by substantial year-to-year variation. Exports of shelled material have trended modestly upward in volume but even now represent an extremely small part of domestic production.[2]

1/ Production and marketing aspects of the domestic industry are discussed in greater detail in Part III.

2/ Appendix Table 2.

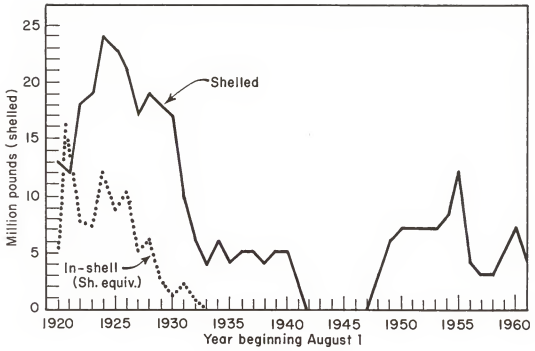

Figure 2. United States Imports of Walnuts for Consumption 1920-1961

Sources: Appendix Tables 3 and 4.

Following the inception of a federal marketing program in 1933 and a federal marketing order and agreement in 1948, substantial amounts of in-shell walnuts have on occasion been designated as "surplus" and diverted into export outlets.[1] Such exports have been included in the data reported above. The relatively large exports of 1958 (Table 2) were, in major part, exported as "surplus" under the marketing order as amended in 1957.[2]

Canada has been the principal recipient of the limited volume of walnuts exported from the United States. Exports to western Europe have totaled as much as 6.7 million pounds in shell but in general have been small and highly variable from year to year during the postwar era. Virtually no shelled walnuts have been exported to Europe. Small amounts of both shelled and in-shell walnuts have been exported to Central and South American countries.[3]

In recent years, six nations (France, Italy, Turkey, Rumania, Iran, and India) have supplied more than 90 percent of United States imports of shelled walnuts. Even during the postwar period, there has been a substantial change in the proportion of total imports supplied by each. Two of the countries, Iran and India, have become increasingly important suppliers since the end of World War II. (See Table 3.)

The secular decline in United States imports of shelled walnuts from France is attributable to three major factors. First, there has been a secular decline in French production of walnuts (Figure 1). In addition, the French have apparently found it profitable to concentrate on marketing of in-shell walnuts in western Europe. In 1951-1955, 62 percent of French exports were in the in-shell form.[4] From that, it may be surmised that production of shelled walnuts is, to a large extent, a by-product of the preparation of in-shell walnuts. Thus, the long-term decline in production, coupled with

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1/ For further information, see Kenneth R. Farrell and William W. Wood, Jr., "Federal Marketing Orders and Agreements for California Fruits, Vegetables and Tree Nuts" (Berkeley: California Agricultural Extension Service, 1963), 47p., and annual statistical reports of the Walnut Control Board, 2040 Pioneer Court, San Mateo, California.

2/ Appendix Table 2.

3/ Exports by country or area of destination are reported in Appendix Table 2.

4/ U. S. Foreign Agricultural Service, op. cit., p. 19.

TABLE 5

United States Imports of Shelled Walnuts, by Country of Origin
Annual Average in Selected Periods and Annual, 1958-1961

Period or year[a]	Country of origin							All countries
	France	Italy	Turkey	Rumania	Iran	India	China	
	thousand pounds							
1920-1924[b]	15,475	397	[c]	189			2,307	26,824
1925-1929	11,570	335	252	603			4,456	25,631
1930-1934	2,891	198	613	332			3,934	9,246
1935-1939	590	22	263	272			3,023	4,478
1948-1952	1,545	1,259	1,126	123	330	208	1,868[d]	5,883
1953-1957	2,753	1,064	681	131	1,291	865		6,905
1958	681	432	988	176	326	467		3,323
1959	183	526	2,092	138	1,133	946		5,424
1960	589	800	2,615	127	364	2,137		6,954
1961	271	107	1,234	243	330	1,240		3,740

a/ Year beginning August 1.

b/ Average of three years, 1922-1924, for specified countries. Total imports are average of five years, 1920-1924.

c/ Blanks indicate imports, if any, included in total.

d/ Average of three years, 1948-1950.

Source: Appendix Table 4.

continued emphasis on the in-shell product, has left a declining volume of kernels available for export. Furthermore, export prices of French shelled walnuts have been high during recent years relative to those of countries such as India and Iran.[1/]

Although Italian production has trended slightly upward, in-shell marketing of walnuts predominates even more in that country (70 percent) than in France.[2/] However, prices of Italian shelled walnuts imported into the United States have been consistently lower than for those imported from France and have corresponded closely with those imported from other countries listed in Table 3. It appears that the Italians, like the French, have continued to concentrate on the traditional in-shell markets of western Europe.

For the reasons just mentioned and because of the growing demand for shelled walnuts in the United States and the increasing production in the Middle East and India, a substantially larger part of United States shelled imports has been secured from Turkey, Iran, and India. In 1948-1952, those three countries supplied only 28 percent of average annual imports; in 1960 and 1961, they supplied about 75 percent of the total. In these countries, where labor is abundantly available for hand shelling, it appears that it may be comparatively advantageous for them to export shelled walnuts while France and Italy exploit in-shell export demand in western Europe.

In the prewar years during which in-shell walnuts were imported in large volume into the United States, three countries--France, Italy, and China--were dominant.[3/] China, for reasons stated previously, is no longer a direct supplier of walnuts to the United States. Imports from France and Italy have been very small in volume since 1948 despite their specialization in exportation of the in-shell product. The declining volume of in-shell walnuts imported into the United States is probably attributable in large part to aggressive development and exploitation of domestic in-shell demand by the California walnut industry. Establishment of standards insuring uniformity

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1/ As indicated by examination of average declared value of United States imports from those countries.

2/ U. S. Foreign Agricultural Service, op. cit., p. 25.

3/ Appendix Table 3.

of product characteristics and the development of advertised brands have made importation of in-shell walnuts into the United States a generally unattractive undertaking. And, as stated previously, France and Italy have found it profitable to continue to supply expanding European markets.

International trade data for countries other than the United States are either incomplete or unavailable. Accordingly, only a partial description of trade flows is possible even for postwar years. (See Table 4.)

TABLE 4

Balance of International Trade in Walnuts, Specified Countries 1953-1962[a/]

Year[b/]	Country					
	France	Italy	Turkey	Iran	India	United States
	thousand pounds, shelled equivalent[c/]					
1953	17,531	[d/]				- 5,807
1954	12,894	6,903			7,885	- 3,786
1955	18,406	15,132			5,344	-10,554
1956	7,332	17,160		4,290	6,761	- 2,774
1957	2,808				8,758	- 1,517
1958	13,650	11,622	2,184	4,524	8,502	2,051
1959	7,098	11,934	2,652	4,290	6,006	- 3,892
1960	14,430	15,990	3,978	780	11,466	- 5,855
1961	9,282	12,558	4,446	780	7,722	- 2,700
1962[e/]	16,770	19,500	3,900	468	7,800	

a/ Exports less imports.

b/ Crop year in respective countries.

c/ For all countries except United States, converted from in-shell to shelled equivalent at 39 percent shelling rate. For United States conversion rates, see Table 2.

d/ Blanks indicate no data available.

e/ Preliminary.

Sources: Appendix Tables 1-7.

All of the major producing countries listed in Table 4, with the exception of the United States, import few or no walnuts.[1/] Thus, all, with the exception of the United States, have had a consistently large, favorable balance of trade in walnuts since 1953. Conversely, the United States position in international trade has been consistently that of a net importer, with the exception of 1958 when large supplies were exported as "surplus" under operation of the federal marketing order and agreement for walnuts. Because very small supplies of walnuts are carried over from year to year in foreign nations, changes in export volume, and thus in the balance of trade, correspond closely with changes in production in those countries.[2/] Those changes and trends have been discussed in preceding paragraphs.

The United States deficit in balance of trade declined between 1953 and 1958; thereafter, it has increased. However, the deficit has been so unstable from year to year that probably no significance can be attached to those short-term changes. The predominant characteristic has been high year-to-year variability resulting primarily from fluctuations in import volume.

The dependency of the major walnut-producing nations on export outlets is indicated clearly in Table 5. All countries, with exception of Iran and the United States, export the equivalent of 50 percent or more of annual production. United States exports of walnuts (shelled equivalent) relative to production have declined persistently since 1930-1934 to the equivalent of 2 percent in recent years. The annual absolute volume of exports from each country varies directly with annual changes in production.

Consumption of imported walnuts as a percentage of total walnut consumption in the United States has undergone a long-term decline. Imports of in-shell walnuts have represented an inconsequential portion of total consumption during the postwar era. However, imports of shelled walnuts, though much smaller in relation to total consumption of shelled walnuts in years prior to 1940, have continued to represent a significant part of total consumption in the country since 1948. As indicated above and even more clearly by examination of yearly data in Figure 3, the absolute, as well as the relative volume of imports, has varied considerably in a short-run, year-to-year context.

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1/ Appendix Tables 5-7.

2/ Carry-over is reported for some countries in Appendix Tables 5 and 6.

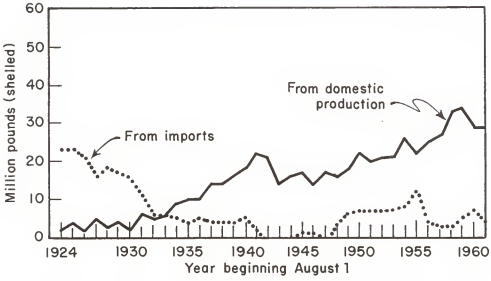

Figure 3. Apparent Acquisition of Shelled Walnuts for Consumption in the United States, 1924-1961

Source: Appendix Table 11.

TABLE 5

Walnuts: Exports Relative to Production in Specified Countries and Imports Relative to Total Consumption in the United States Annual Average in Selected Years and Annual, 1958-1962

Period or year[a]	Exports as percent of production (shelled equivalent)						Imports as percent of consumption in the United States	
	France	Italy	Turkey	Iran	India	United States	In shell	Shelled
1925-1929	[b]						23.9	84.2
1930-1934						11.1	4.0	60.3
1935-1939						9.9	0.3	25.4
1948-1952						2.2	0.1	23.2
1953-1957	65.4	62.4[c]			84.5[c]	3.5	0.2	22.2
1958	60.7	59.6	46.7	65.9	94.8	7.2	0.1	9.2
1959	51.1	69.5	46.6	64.7	85.6	2.9	0.2	13.7
1960	66.1	77.4	55.4	22.2	94.8	1.8	0.1	19.4
1961	59.3	81.5	52.8	23.8	94.3	1.8	0.1	11.3
1962[d]	69.3	69.4	58.8	16.7	83.3			

a/ Marketing year in respective countries.

b/ Blanks indicate no data available.

c/ Average of four years, 1954-1957.

d/ Preliminary.

Sources: Appendix Tables 1-7 and 11.

In addition to walnuts entering world trade from the sources indicated previously, it is known that exports of Communist China have been increasing in volume. (See Table 6.) Those exports, predominantly in the form of kernels, have been directed principally to Canada, the United Kingdom, West Germany, and Switzerland. Canada has been the principal receiver.[1/]

1/ California Federal-State Market News Service, Foreign Fruit and Nut Report No. 82 (Sacramento, February 15, 1963), 3p.

TABLE 6

Exports of Walnuts from Communist China
to Non-Communist Countries, 1951-1960

Calendar year	Volume exported
	thousand pounds, shelled equivalent[a/]
1951	340
1952	261
1953	264
1954	369
1955	459
1956	765
1957	758
1958	426
1959	523
1960	790

a/ Converted from in-shell to shelled equivalent at shelling rate of 39 percent.

Source: California Federal-State Market News Service, Foreign Dried Fruit and Nut Report No. 20 (Sacramento, December 4, 1961), p. 3.

Although small in relation to those of other major producing nations, the volume of exports from Communist China to non-Communist countries more than doubled between 1951 and 1960. Even at the comparatively high level of 1960, total exports to the non-Communist world were 29 percent less than the volume exported to the United States alone in 1950. It is not known whether this large apparent decline in exports to the non-Communist world resulted from a decline in production in China, an increase in total consumption in China, development of trade outlets in Communist countries, or some combination of the three. There is also the possibility that exports to some non-Communist countries have not been included in the data reported above. However, if those data are indicative of the actual volume of Chinese trade with the non-Communist world, that country can scarcely be considered as a major supplier, even at the comparatively high level of exports in 1960.

In addition to the countries in which walnuts are produced in large commercial volume, substantial quantities of walnuts are consumed in such industrialized countries or areas as Canada, the United Kingdom, West Germany, and Scandinavia. (See Tables 7 and 8.)

Unfortunately, data are not available to permit derivation of detailed trade flows between the major walnut-producing nations and the principal walnut-importing nations other than the United States. Yet, data contained in Tables 7 and 8 indicate several relationships of indirect significance to the United States walnut industry.

First, total walnut consumption, as indicated by the total volume of imports, increased appreciably between 1948 and 1961 in most of the countries for which data are available. Increased population and per capita incomes, as well as increased availability of walnuts for importation, probably have contributed to rising consumption in the countries specified. Canadian imports in 1961 were nearly one-third greater in volume than the annual average of 1948-1952; West German imports increased by 22 percent between 1953-1957 and 1961. Total imports into the United Kingdom, omitting the year 1949 when an abnormally large volume of in-shell walnuts were imported, have increased slightly. Increased imports and apparent consumption in the countries of western Europe may account, in part, for the decline in the importance of France and Italy as suppliers of walnuts to the United States.[1/] The probability of further increases in population and per capita real income in west European countries suggests that a large part of French and Italian exportable walnut supplies, even if increased moderately, will continue to be disposed of in western Europe rather than in the United States.[2/]

Concomitant with the expansion in total imports of walnuts, there has been an increase in the volume of shelled walnuts imported into countries listed in Tables 7 and 8. Shelled walnut imports exceed in-shell imports in volume in Australia and Canada; they are approximately equal in the United Kingdom and Denmark. West Germany is still primarily an importer of the

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1/ See page 21.

2/ Data contained in California Federal-State Market News Service Foreign Fruit and Nut Report No. 82 indicate that 90 percent of in-shell and 80 percent of shelled walnuts exported from France were directed to other west European countries in 1961.

TABLE 7

Imports of Shelled Walnuts in Specified Countries, Annual Average in Selected Periods and Annual, 1958-1961

Country	Period or year[a]					
	Average, 1948-1952	Average, 1953-1957	1958	1959	1960	1961
	thousand pounds					
Australia	b/	941	900	1,064	1,077	1,057
Canada	5,634	8,604	7,791	11,408	9,253	7,659
Denmark	34	69	85	92	112	128
West Germany	b/	629	692	661	737	822
United Kingdom	1,779	4,290	4,496	5,230	4,688	5,002

a/ Calendar year.

b/ No data available.

Source: Gill & Duffus, Ltd., Edible Nut Statistics (London, 1963), p. 10.

TABLE 8

Imports of In-Shell Walnuts in Specified Countries, Annual Average in Selected Periods and Annual, 1958-1961

Country	Period or year[a]					
	Average, 1948-1952	Average, 1953-1957	1958	1959	1960	1961
	thousand pounds					
Australia	394	374	560	618	721	627
Belgium[b]	2,901	2,536	2,312	2,829	3,443	2,180
Canada	2,092	2,560	2,654	2,352	2,181	2,348
Denmark	81	291	645	428	706	647
West Germany	c/	22,326	33,049	25,605	33,266	27,299
Netherlands[b]	715	1,725	1,794	1,830	2,343	1,826
New Zealand[b]	220	500	385	300	515	513
Norway[b]	7	1,154	1,187	963	992	970
Sweden[b]	813	1,165	1,346	1,225	1,445	1,452
Switzerland[b]	2,395	2,282	2,282	2,710	2,464	2,114
United Kingdom	20,216	11,635	12,871	9,616	14,320	9,332

a/ Calendar year.

b/ Combined shelled and in-shell.

c/ No data available.

Source: Gill & Duffus, Ltd., Edible Nut Statistics (London, 1963), p. 10.

in-shell product, even though importation of kernels increased 30 percent between 1953-1957 and 1961.[1/] The development of shelled walnut markets in Canada and in Europe, as in the United States, may be reflecting rising per capita income of consumers and a consequent increase in demand for prepackaged "convenience" items. If such a demand is, in fact, emerging in those and other countries in western Europe, it could mean a growing demand for shelled walnuts from countries such as Turkey, Iran, and India, particularly if per capita incomes rise at projected rates.[2/] The United States industry might gain indirectly through those developments to the extent that the major exporters of shelled walnuts become less dependent upon the United States market for disposition of exportable supplies.

Tariffs and Other Trade Barriers

For reasons developed in previous sections, the interests of the United States walnut industry in the forthcoming GATT negotiations have been directed, in major part, toward questions concerning the economic effects on the domestic industry of lower United States tariffs on shelled walnuts. It is pertinent, therefore, to trace the evolution of United States tariffs for walnuts and to examine the structure and level of prevailing tariffs.

Although walnuts have a tariff history dating from the earliest tariff acts, there were no important changes in the rates of duty before the Tariff Act of 1922. In that legislation, relatively large increases in rates were provided, particularly for shelled walnuts. The Tariff Act of 1930 provided further increases (Table 9).

TABLE 9

United States Tariffs on Walnuts

Tariff act	Tariff	
	In shell	Shelled
	cents per pound	
1913	2	4
1922	4	12
1930	5	15

Source: U. S. Tariff Commission, Edible Tree Nuts, War Changes in Industry Series, Report No. 18, 1946, p. 52.

1/ Comparisons are on a kernel-weight basis.

2/ Income and consumption projections for western Europe are discussed on page 37.

With one temporary exception, tariffs for in-shell and shelled walnuts have remained at the levels prescribed in the Tariff Act of 1930. In May, 1948, the duty was reduced to 7.5 cents per pound for the first 5 million pounds of shelled or prepared walnuts to enter in any calendar year. The concession on shelled walnuts, initially negotiated with China and included in GATT, was withdrawn in December, 1950, after China ceased to be a party to GATT.[1/] The concession on prepared walnuts was retained and is effective currently as are the rates for shelled and in-shell walnuts prescribed in 1930 and specified above.

A better measure of the level of tariffs can be obtained by transforming the foregoing specific duties into their ad valorem equivalents (Table 10).

TABLE 10

United States Tariffs for Walnuts, Ad Valorem Equivalents Annual Average in Selected Periods and Annual, 1958-1961a/

Period or year	In-shell	Shelled
	percent of declared value of imports	
1927-1929	35	40
1931-1933	72	87
1938-1940	69	114
1948-1952	28	38
1953-1957	25	31
1958	22	34
1959	24	32
1960	21	31
1961	21	31

a/ Averages for selected periods are ad valorem equivalents for each year weighted by volume of imports for each year.

Sources:

1927-1929, 1931-1933, and 1938-1940: U. S. Tariff Commission, Edible Tree Nuts, War Changes in Industry Series, Report No. 18, 1946, p. 34.

All other periods and years: Calculated from specific duties listed in Table 9 and average declared value of imported walnuts for years beginning August 1 as compiled from U. S. Bureau of the Census, United States Imports of Merchandise for Consumption: Commodity by Country of Origin, Report FT 110, monthly issues.

1/ U. S. Tariff Commission, Tree Nuts: Report to the President Under Section 22 of the Agricultural Adjustment Act as Amended, and Proclamation by the President, 1951, p. 5.

There have been substantial reductions in walnut tariffs expressed in ad valorem equivalent terms. As the declared value of imports rose after 1938-1940, specific tariffs as a percentage of declared value dropped sharply to 21 and 31 percent in the past two years for in-shell and shelled walnuts, respectively. This suggests that United States tariffs have, by themselves, become a less effective restraint on the volume of walnuts imported than in years prior to World War II. It is also evident that tariffs on kernels have been consistently higher than for in-shell walnuts.[1/]

In addition to tariffs, two sections of the Agricultural Marketing Agreement Act of 1937, as amended, are of relevance to any discussion concerning importation of walnuts. Section 22 provides that whenever the Secretary of Agriculture has reason to believe that any article or articles are either being or practically certain to be imported into the United States in such quantity as to tend to render ineffective or materially interfere with any program initiated under the Act by the U. S. Department of Agriculture, he shall notify the President. If the President concurs, he shall request an immediate investigation of the U. S. Tariff Commission. The Tariff Commission, acting in its advisory capacity, shall recommend a course of action to the President. The President is authorized to impose quotas and/or fees on imports if he deems necessary. Although the walnut industry has petitioned several times for a hearing before the Tariff Commission, and on one occasion in recent years was granted a hearing, no action has been taken under this statute to regulate or restrict importation of walnuts. It remains, however, as a potential means of regulating imports when such imports render ineffective or materially interfere with the implementation of marketing policies promulgated under the federal marketing order and agreement for walnuts.

Section 8(e) provides that whenever any regulation of grade, size, quality, or maturity is in effect under a federal marketing order for specified commodities, including walnuts, imports of such commodities are prohibited unless they meet those specified standards prevailing for the domestic industries. Should the Secretary of Agriculture find that effective order regulations are not directly applicable to the imported commodity, he shall designate appropriate standards for such imported commodity. Walnuts were

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1/ Only very small amounts of blanched, roasted, or otherwise prepared, walnuts are imported into the United States and for that reason tariffs for that classification have not been considered in this report.

first included in this section in 1961. The effects of the legislation on the volume of walnuts imported appear to have been minor thus far.

Tariffs of other nations have not been of great direct importance to the United States walnut industry because of the relatively small volume of exports in recent years. However, adjustments in tariffs in major consuming nations which lead to alterations in the international flow of trade could have indirect effects on the domestic industry by increasing or decreasing supplies exported to the United States. For this reason, the recently announced common external tariff of the European Economic Community was of interest to the domestic walnut industry.

The common external tariff, applicable to the six member countries, will be 8 percent ad valorem (shelled and in-shell) and will become effective, according to present plans, not later than January 1, 1967.1/ At that time, there will be no tariff on intra-Community movement of walnuts. The common or single external tariff will apply to all walnuts imported into each of the six member nations except those imported from Turkey. That nation became an associate member of the Community in September, 1963, and will have, presumably, duty-free access to the walnut markets of the six member nations.

Prior to the inception of the Common external tariff, each member country will adjust its prevailing tariff toward the specified 8 percent. The net effect of these adjustments will be to raise tariffs in West Germany, a large importer of walnuts, and to lower duties in France and Benelux. However, in no instance are the announced tariffs greatly different from those prevailing in the individual countries in early 1963. West German tariffs, for example, will rise from 4.5 percent; Benelux tariffs will decrease from 9.4 percent. Thus, the possibility of any substantial redirection of trade as a result of the Community's tariff action seems rather remote. France, Italy, and Turkey, in having duty-free access to markets of member countries, will be placed in an advantageous position in the large West German market relative to other suppliers such as Iran and Syria. Yet, because most West German imports are probably now derived in large part from France and Italy and because non-EEC European markets will continue to be accessible to all suppliers of walnuts,

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1/ The member countries are France, Italy, West Germany, Belgium, the Netherlands, and Luxembourg.

it would appear that there is little possibility of the Community's actions generating any substantial indirect effect on the volume of walnuts imported into the United States.

There are a few nontariff barriers restricting world trade in walnuts. In late 1962, France and Japan were still prohibiting importation, Mexico was limiting imports by certain irregular or arbitrary procedures, and Venezuela was subjecting imports to licensing and foreign exchange control restrictions.[1/] Presumably, other countries, like the United States, require imported walnuts to meet specified standards with respect to purity. Otherwise, walnuts were free to flow into major markets throughout the world subject only to tariffs.

Foreign Production, Consumption, and Trade Prospects

The paucity of relevant data precludes anything but the crudest appraisal of foreign walnut production, consumption, and trade. Data indicating age distribution of bearing or nonbearing walnut trees or even total acreage or number of trees in foreign countries are not available. Observers of foreign walnut industries report that production of walnuts in cultivated, commercial orchards is virtually nonexistent in some walnut-producing nations. In most countries of the Mediterranean Basin ". . . the industry consists largely of trees scattered on grain or other field crop land, along roads or property lines, in the hills, or in little groves or clusters, which can hardly be called orchards."[2/]

Under these circumstances, virtually nothing of a quantitative nature can be said concerning the future production of walnuts in foreign countries. Because of the wide variation in production between successive years, projection of production from data for the years 1948-1961 has little meaning from the

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1/ U. S. Foreign Agricultural Service, Prospects for Foreign Trade in Fruits, Vegetables, Tree Nuts, 1963, 26p.

2/ U. S. Foreign Agricultural Service, The Walnut and Filbert Industries of the Mediterranean Basin, by William C. Tesche, Foreign Agriculture Report No. 93, 1956, p. 7.

standpoint of objectives to which this study is directed.[1/] Notwithstanding the inability to formulate quantitative estimates of future foreign walnut production, several factors suggest a gradual increase in foreign production could occur during the remainder of the 1960's.

The longevity of the walnut tree suggests that a part (unfortunately an unknown part) of current bearing acreage in foreign countries will remain fixed in production for many years. Many trees continue to produce for five or more decades. The tendency is to continue harvesting of walnuts as long as prices exceed variable costs of harvesting. And, in developing countries such as India, Turkey, and Iran, where opportunity costs for family labor may be extremely low or zero, the principal determinant of production may not be economic but physical in nature; whatever the tree produces is harvested at any price greater than zero. This characteristic, coupled with possibilities of increased yield through more effective control of plant diseases, better pruning, and fertilization, suggests the possibilities of a growing, or at least not diminishing, production potential.

But the lengthy period of seven or eight years required to bring a walnut tree into production, once planted, also imposes an important constraint on the possibilities of increasing short-run production by additional planting of trees. Although some increase in yields from existing bearing acreage is possible, the short-term (seven to eight years) production response is likely to be highly inelastic with respect to changes in walnut prices.

In sum, slowly rising foreign production might be anticipated. Without information on age distribution of trees, there is no way by which the rate of increase can be projected quantitatively. On balance, however, foreign walnut production in the remainder of the 1960's is more likely to be characterized by continued high year-to-year instability rather than by any pronounced trend in average level.

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1/ A linear trend fitted to production data for the years 1948-1961 indicated that total walnut production in foreign, non-Communist countries increased at an average annual rate of 106 tons. However, because of wide annual variations in production, the standard error of estimate was so high as to render the equation virtually useless for purposes of projection or forecasting of future production.

The empirical basis for deriving projections of walnut consumption in foreign countries is scarcely more adequate than that just described for walnut production. The author has been able to locate only one study containing projections of tree nut consumption.[1] And, assumptions and procedures employed in that study raise questions concerning the usefulness of the results.

Projections contained in the EEC report just referred to have been based upon the assumption of constant per capita consumption of tree nuts in total. Whether the use of an income elasticity of zero implied by the foregoing assumptions was a matter of expediency or was based upon statistical analyses of demand is not known. But assuming aggregate per capita consumption of tree nuts in western Europe does remain constant, population projections for that area suggest an annual growth of 0.7 percent through 1970.[2] If the income elasticity of demand for tree nuts is, in fact, positive, the foregoing projections understate the possible increase in total consumption which might occur by 1970. In the absence of information pertaining to current composition of tree nut consumption in Europe and production and price prospects for nuts other than walnuts, there is no way of projecting the manner in which walnuts might share in the projected expansion of total consumption. Trends in the volume of walnuts imported into Canada, Australia, and west European countries specified in Tables 7 and 8 seem to indicate that walnut consumption expanded at a more rapid rate than population in the period 1948-1961. Yet, that was a period characterized by substantial increases in production of walnuts in western Europe and very large increases in per capita real incomes. Whether consumption will continue to expand at such rates would seem doubtful in view of the somewhat slower increase in per capita incomes in Canada, Australia, and western Europe during very recent years.

In consideration of the likelihood of a gradual increase in both foreign production and total foreign demand for walnuts, it would seem improbable that walnut supplies available for export to the United States will undergo any

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1/ Communauté Economique Européenne, Tendances de la Production et de la Consommation en Denrées Alimentaires dans la C.E.E., Etude: Serie Agriculture, Nr 2 (Bruxelles, 1960), pp. 24-27.

2/ Food and Agriculture Organization of the United Nations, Agricultural Commodities--Projections for 1970 (E/CN.13/48/CCP.62/5) (Rome, 1962), p. iii. (Special Supplement to Commodity Review, 1962.)

large short-term change from the average levels of the past several years. Barring a succession of favorable crops in the major areas of production, a large increase in the supply of competitive nuts, or the reentrance of China as a major supplier of the non-Communist world, foreign production is likely to increase at about the same rate as total demand in countries other than the United States. For reasons developed previously, it is probable that United States imports during the next several years will continue to be composed principally of shelled walnuts principally from India and the countries of the Middle East. France, Italy, and perhaps Turkey, because of her association with the EEC, will likely continue to dispose of much of their exportable supplies in western Europe.

Although a reasonably balanced growth in foreign production and demand for walnuts seems likely over the remainder of the 1960's, it is also probable that there will be years of abnormally large and small production volume in particular countries. Coincidence in the direction of changes among several countries could alter greatly the supplies of walnuts entering world trade and imported into the United States.[1/] Thus, it seems that the economic problems associated with short-term instability in production rather than the development of a basic imbalance in longer-term rates of growth of production and demand will be the principal problem in international trade in walnuts, at least during the remainder of the 1960's.

1/ See statistical analyses in Part III.

PART III: THE UNITED STATES WALNUT INDUSTRY: TRENDS, PROSPECTS, AND ECONOMIC RELATIONSHIPS

Long-term changes in United States walnut production and the position of the American walnut industry in international trade have been discussed in Part II. In this part, attention will be directed towards a more detailed description of recent trends in the production, marketing, and consumption of walnuts in the United States for the purpose of making short-term projections and as a means of developing the economic context within which United States tariff reductions might take place. Finally, this part contains the results of statistical analyses of factors affecting the United States demand for and imports of shelled walnuts.

Production Trends and Prospects

Approximately 95 percent of the commercial production of English walnuts in the United States is from California. Most of the remaining 5 percent is from Oregon; a very small volume is produced in Washington. The farm value of United States production has ranged from $30 million to $39 million annually during the past five years; the value of California production has ranged from $28 million to $38 million in the same five years.

Long-term changes in United States production have been described in Part II.[1/] They need not be restated at this point beyond noting that post-World War II production has been characterized by substantial year-to-year variation rather than any pronounced trend. However, in order to make projections of future production, it is necessary to examine trends in acreage and yield during the past few years. Because of the dominant position which it occupies nationally in production of walnuts and the availability of data, the discussion will be confined principally to developments in California.

California bearing walnut acreage in 1963 is estimated at 126,200.[2/] This is only slightly below the record-high bearing acreage of 130,000 in 1939

1/ See pages 14-17.

2/ Acreage, yield, production, price, and income data are contained in Appendix Table 8.

and approximately equal to the post-World War II high of 126,299 acres attained in 1947. The near record-high level of current bearing acreage follows the upturn in bearing acreage beginning in 1957 after a period during the first half of the 1950's in which bearing acreage was comparatively stable at 113,000 to 115,000 (Figure 4).

The recent upturn in bearing acreage reflects the comparatively large plantings made during the early and mid-parts of the 1950's. As indicated in Figure 4, nonbearing acreage in the state rose appreciably in the early 1950's, trended downward to 23,000 acres in 1954, and has since increased to 41,000 in 1961 and 39,000 in 1962. Current nonbearing acreage is greater than at any time since the early part of the 1930's.

Allowing eight years for newly planted trees to attain bearing age and assuming that trees planted during the past eight years will not be removed prior to bearing, the current distribution of trees by age indicates that acreage coming into bearing during the next seven years would be as shown in Table 11.

TABLE 11

Projected Acreage of Walnuts Attaining Bearing Age, California, 1964-1970

Year[a/]	Projected acreage attaining bearing age[b/]
1964	5,455
1965	8,407
1966	8,410
1967	6,341
1968	4,145
1969	2,885
1970	1,767

a/ Crop year basis.

b/ Reported plantings in eighth preceding year.

Source: California Crop and Livestock Reporting Service, California Fruit and Nut Acreage (Sacramento, annual issues).

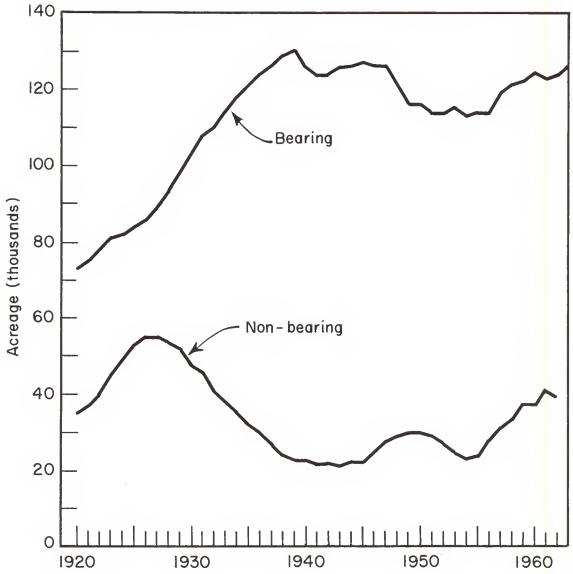

Figure 4. Bearing and Nonbearing Acreage of Walnuts California, 1920-1963

Source: Appendix Table 8.

The total bearing acreage of walnuts during the remainder of the decade will, of course, be influenced not only by acreage attaining bearing age but also by removal of current bearing acreage. Some trees will be removed because of old age; 40 percent of the current walnut acreage consists of trees 25 years old and older. Some trees possibly will be removed because of more profitable cropping alternatives. Perhaps most important, a large number of trees will be removed to make way for industrial and urban expansion. Acreage in the counties of Ventura, Santa Clara, and Contra Costa would seem to be particularly vulnerable in this respect. Currently, there is a total of 27,300 bearing acres in those three counties. There is, of course, no means by which removal of bearing acreage of walnuts during the next seven years can be forecast reliably. Throughout much of the decade of the 1950's, an average of about 4,000 acres were removed from bearing each year.[1/] It appears that removal of acreage in recent years has continued at about that level.

Assuming that removals continue to occur at the apparent rate of the past few years, a gradual increase in California's bearing acreage can be expected throughout most of the remainder of the 1960's. Conceivably, bearing acreage might total 130,000 to 132,000 by 1970.

Walnut yield per acre has increased markedly during the past four decades (Figure 5). In the five years 1958-1962, yield averaged 0.57 tons per acre (in shell); in 1920-1924 and 1935-1939, the comparable average was 0.32 and 0.42 tons per acre, respectively. The period of most rapid increase in yield was that of 1930 through the late 1940's. During the past 15 years, there has been no distinct trend in yields. The most noticeable characteristic of per acre yield in those 15 years has been rather wide annual variations which, in part, may be the result of changes in varietal composition of bearing acreage.[2/]

Per acre yield during the remainder of the decade may be expected to exhibit the same relative annual variation as during the past 15 years. Random variation in climatic conditions during the maturation of the crop will continue to result in variations in yield. In addition, some varieties of walnuts, particularly the Franquette variety which is of major importance in

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1/ Kenneth R. Farrell and Ralph G. Rush, "Walnut Acreage and Yield," Diamond Walnut News, Vol. XXXXII, No. 5 (September, 1960), p. 21.

2/ Ibid., p. 22.

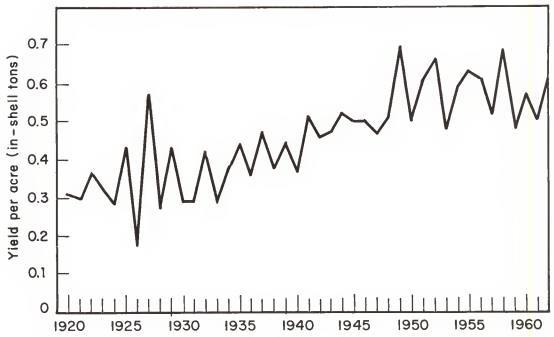

Figure 5. Yield of Walnuts Per Acre, California, 1920-1962

Source: Appendix Table 8.

northern California, have a tendency toward alternate bearing. Several factors, including closer planting of trees, improved irrigation and insect control, more extensive or improved pruning practices, and an increased proportion of heavier producing varieties, suggest the probabilities of some increase in average annual yield during the next decade. On the other hand, the expected higher proportion of younger trees in bearing during that period may exert the opposite influence on average yield in the state.

Assuming that bearing acreage attains the projected level of 130,000 to 132,000 acres and that yield per acre in the next seven years equals that of the past seven years, walnut production in California might approach an annual average of 74,000 to 75,000 tons by 1970. Such production would be 10 to 11 percent higher than during the past seven years. Assuming that production in Oregon continues to average close to the levels of recent years, Pacific Coast production of walnuts could approach an annual average of 79,000 to 80,000 tons by 1970. If, in fact, yield per acre averages higher by 1970 than during the past seven years, total production would accordingly exceed the projections just cited.

Marketing and Utilization

Production of walnuts in California is a highly specialized, commercialized business activity. Very little of the crop is used on farms where it is produced; very little is sold directly by producers to retailers or final consumers. The bulk of the crop, after hulling and drying, is delivered to local buyers or local cooperative packing plants. The local private or independent buyer and the local unaffiliated cooperative then grade and blend the nuts for in-shell distribution and usually will shell, grade, and blend a part of his receipts for distribution in shelled form. The local cooperative packing plant, if part of the large Diamond Walnut Growers Association, may also perform limited grading activities, particularly the removal of culls and blows, before the nuts are shipped to the centralized cooperative plant for final grading, blending, shelling, and distribution throughout the country or other parts of the world.

More than 50 percent of California's annual production of walnuts is distributed through the Diamond Walnut Growers Association at Stockton. Although

there has been a decline in the proportion of the crop handled by the Association, it remains by far the largest single marketing organization in the walnut industry. In occupying this position, the Association is able, apparently, to exert considerable leadership in the pricing of walnuts at the grower level as well as in distribution channels. Unlike the situation which prevails for many agricultural products produced in the United States, in which many thousands of producers dispersed across wide geographic areas market their product through a myriad of local receiving, subterminal, and terminal marketing facilities, walnuts produced by a comparatively small number of growers are marketed by a "few" organizations. In that sense, the process by which walnut prices are determined deviates clearly from the classical economic concept of price determination under pure or perfect competition and its attendant condition of "many" buyers and sellers.[1/] In part, because of this industry structure, there is less relative variation in walnut prices at the grower and handler level, at least intraseasonally, than for agricultural products produced nationally by many growers and handled by many marketing agencies. The existence of substantial storage facilities at the handler level, coupled with the economic structure of the industry, makes it possible for individual handlers to exercise appreciable intraseasonal control over the timing of distribution of walnuts.[2/] Significantly for the analysis at hand in this report, walnut prices are not arrived at through the processes of a "perfect" market; price offers made by the industry "leader" at the beginning of the marketing season become a basis for pricing throughout the industry. Usually "opening" prices are not adjusted frequently or by large increments within a given marketing season.[3/]

1/ The terms "many" and "few" in this context refer to the inability (or ability) of a buyer or seller to exert individually some effect upon market price of the product. "Many" buyers or sellers refer to a market situation where a single buying or selling agency cannot influence market price by varying the quantities purchased or supplied, respectively, in the market; "few" buyers or sellers exist when the converse situation prevails.

2/ In this report, handlers are considered as those who prepare (grade, blend, and shell) and distribute walnuts received from growers.

3/ Based upon observation of data supplied by industry organizations.

In addition to the economic control of the marketing of walnuts which may be exercised by individual handlers in the industry, walnut growers and handlers may jointly regulate the total volume of walnuts marketed, the allocation of that volume between in-shell and shelled outlets, and the grade and size of walnuts through operation of the federal marketing order for walnuts.[1] In contrast with the situation which prevails for many types of perishable farm products, annual consumption of walnuts is not completely predetermined by annual production. Part of current production may be withheld from the market by handlers acting individually; part may be withheld from primary markets and diverted to secondary or by-product outlets such as oil manufacturing under operation of the federal marketing order. "In a year of heavier than normal production, . . . the volume control provisions of the program /marketing order/ can be used to cut down the supply available in the market, . . . so that prices paid . . . will reflect favorable prices to growers."[2] In years of relatively small production of walnuts, carry-over from the preceding year may be used to supplement supplies from current production.

In fact, the price of walnuts at both the f.o.b. and grower levels of the marketing system varies considerably between successive years.[3] Although the relative variation between successive years is appreciably less for annual available supplies of shelled walnuts than for total production of walnuts, it nevertheless appears that current production of walnuts is the principal determinant of current available supplies of shelled walnuts.[4] Thus, just as annual production of walnuts would seem logically to be largely predetermined in a given year with respect to price in that year, it appears that the available supply of shelled walnuts has been highly, though less than perfectly,

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1/ For a discussion of the federal marketing order for walnuts, see A. J. Tarlock and Ralph Rush, "Walnut Marketing Control Program: Objectives and Theories," Diamond Walnut News, Vol. XXXXI, No. 3 (May, 1959), pp. 14-15 and 22; also, Farrell and Wood, op. cit.

2/ Tarlock and Rush, op. cit., p. 14.

3/ See Appendix Tables 8 and 13.

4/ The relative variation (sign ignored) in production between successive years during the years 1948-1961 ranged from 2.7 to 33.2 percent and averaged (simple) 18.5 percent. The comparable variation in available supply of shelled walnuts was within a range of 0.4 to 28.0 percent and averaged 12.5 percent.

inelastic in the same year with respect to the range of prices experienced in recent years in the industry, notwithstanding the use of supply-regulating devices referred to above.[1/]

Many important changes have occurred in the marketing and utilization of walnuts during the past three decades. Some of the changes were discussed in Part II--the increased dependency of the industry upon markets in the United States, particularly for disposition of in-shell walnuts, and the marked change in composition of imports in favor of shelled walnuts. In addition, there have been pronounced changes in various technical aspects of marketing, including new and more efficient methods of handling, improved methods of sorting and grading, and the development and widespread acceptance of a variety of "packs" for direct distribution to consumers through retail outlets. The most significant change from the standpoint of this report has been the pronounced increase in the volume of walnuts sold in shelled form (Figure 6).

Prior to the late 1930's, the commercial shelling of walnuts on the Pacific Coast was confined largely to culls and blows--by-products of the preparation of walnuts for in-shell markets. As total production of walnuts increased, so did sales of shelled walnuts. Yet, by the mid-1930's, sales volume of the shelled product totaled only 10 to 15 million pounds per year or about 50 to 60 percent of the annual sales of in-shell walnuts on a shelled equivalent basis. After World War II, production and sales of kernels increased sharply as new consumer packs were developed and as the level of economic activity in the country rose. In 1957, sales volume of the shelled product exceeded that of in-shell walnuts (shelled equivalant) for the first time. During the past five years, sales of shelled walnuts have represented 53 to 58 percent of the sales volume of all walnuts expressed in shelled equivalent terms. Thus, in a period of three decades, the shelling of walnuts has progressed from a small by-product operation to a large and vital economic activity of the walnut industry, accounting currently for 50 to 55 percent of handlers' annual gross income received from sales of walnuts.[2/]

1/ One of the limitations to interseasonal supply stabilization programs for walnuts is the limited storage "life" of the product, particularly in its shelled form.

2/ Derived by multiplying average f.o.b. California prices of shelled and in-shell walnuts by respective sales volume (buyer acquisitions from handlers) of each. See Appendix Tables 10 and 13.

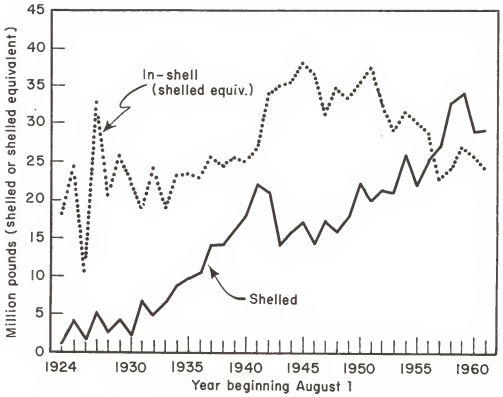

Figure 6. Sales of Walnuts by Handlers, Pacific Coast, 1924-1961

Source: Appendix Table 10, with in-shell trade acquisition converted to shelled at 42 percent.

In addition to the changes just described with respect to total production and sales, there have been some significant long-run changes in the distribution of shelled walnuts among various outlets. In 1935-1937, about 80 percent of the shelled walnuts were utilized in two outlets--the baking and confectionery industries (Table 12). In the early 1950's, those two outlets were absorbing approximately 50 percent of shelled walnut sales. Sales to the confectionery trade alone fell from 35 percent of all sales in 1935-1937 to 11 percent in 1950-1952. In contrast, the proportion of total sales to households (assumed to be the major component of "other" uses in 1935-1937) increased from 15 percent in 1935-1937 to 39 percent in 1950-1952. Although data pertaining to sales distribution in very recent years are not available, some individuals in the walnut industry believe that shipments of shelled walnuts for direct consumption in households may constitute nearly 50 percent of the total volume of kernels shipped by Pacific Coast walnut handlers.

On the basis of data contained in Table 12 for the years 1950-1952, it appears that shelled walnuts may compete with several other types of shelled tree nuts in bakery outlets. Considering both the distribution and total available supplies of shelled nuts in recent years, pecans appear to be the most important potential competition of shelled walnuts in bakery outlets. Almonds and pecans appear as the principal potential competitors with walnuts in the confectionery outlets. Shelled pecans and possibly walnuts or other tree nuts in-shell may compete with shelled walnuts which are prepared for direct consumption in households. The nature of relationships between shelled walnuts and other tree nuts is analyzed statistically in the section which follows.

Economic-Statistical Analyses of Demand and Imports

Data presented in foregoing sections of this report have indicated that United States imports of walnuts during the past 30 years have been predominantly shelled walnuts. For reasons also developed previously, future imports of walnuts are also likely to consist almost exclusively of kernels.[1/] Thus, the questions concerning the economic impacts of United States tariff reductions

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1/ Pages 21-24.

TABLE 12

Shelled Tree Nuts: Estimated Distribution of Sales Among Major Outlets
United States, Annual Average in Selected Periods

Nut	Average, 1935-1937					Average, 1950-1952					
	Bakers	Confec-tioners	Salters	Ice cream	Other	Bakers	Confec-tioners	Salters	Ice cream	House-holds	Other
	percent of sales										
Walnuts	45	35	--a/	5	15	39	11	--	4	39	7
Pecans	40	27	5	17	11	44	20	7	12	12	5
Almonds	10	70	5	--	15	8	64	13	5	10	--
Filberts	50	20	25	--	5	28	28	43	b/	b/	b/
Cashews	5	5	85	--	5	4	6	90	--	--	--
Brazils	15	50	25	--	10	17	33	50	--	--	--
Pignolias	5	75	5	--	15	c/					
Pistachios	--	--	80	15	5						

a/ Dashes indicate distribution, if any, insignificant and not represented in arriving at total utilization of 100 percent.

b/ Less than 1 percent.

c/ Blanks indicate no data available.

Sources:

1935-1937: U. S. Tariff Commission, Edible Tree Nuts, War Changes in Industry Series, Report No. 18, 1946, p. 65.

1950-1952: U. S. Agricultural Marketing Service, Marketing Tree Nuts: Trends and Prospects, Marketing Research Report No. 139, 1956, p. 12.

are relevant principally and directly with respect to shelled walnuts. Indirectly, tariff reductions on shelled walnuts might affect prices and income from sale of in-shell walnuts if the two product forms are, in fact, related in demand or supply. The remainder of this section is devoted to development and discussion of an economic-statistical model by means of which the impacts of tariff reductions can be assessed and the reporting of empirical results of analyses of factors affecting United States demand for and imports of shelled walnuts.

Economic Considerations

The simplest conceivable international trade model is one involving only two countries (say, the United States and the "rest of the world") producing a single, homogeneous product under conditions of perfect competition and where costs of transferring the product between countries are given. Given a supply and demand function for the product in each of the two countries, the volume of international trade and the consumption and price of the product in each county could be determined. Under these abstract conditions, the "equilibrium" price of the product in the importing country will exceed the price in the exporting country by an amount equal to the cost of transferring the product between countries. The volume of international trade--that is, the amount of the product imported by one country and exported by another--depends upon the characteristics (level and elasticity) of the supply and demand function in the two countries and costs of transferring the product between the two countries.

The real world situation is, of course, much more complicated. For various reasons, the "equilibrium conditions" referred to above may never be attained fully; knowledge is less than perfect, production and trade takes place not under static and certain conditions but under dynamic and uncertain conditions, and there are a host of institutional factors impinging upon trade. From the standpoint of empirical analysis, some of the functional relationships necessary for determination of the equilibrium conditions specified above are usually unavailable and frequently cannot be estimated because of data limitations. This situation prevails to some degree in the case of walnuts.

Despite such limitations, useful empirical analyses can sometimes be conducted within the constraints imposed by available data. In the particular

case of international trade in walnuts, it is impossible to estimate walnut demand and supply functions for foreign walnut-producing nations. Much of the data which would be required are unavailable. Yet, on the basis of the model diagrammed in Figure 7 and described below, economic relationships useful in the estimation of the effects of tariff reductions may be quantified.

Figure 7 represents hypothetically the demand for and supply of a homogeneous commodity in the United States and in another area, say, the rest of the world. Demand and supply functions in the United States are depicted by lines D D and S' S, respectively; in the other area, by D_1 D_1 and S_1 S_1, respectively. For the purposes at hand, the demand and supply functions for the rest of the world have been placed back-to-back with those in the United States. Quantities demanded or supplied in the United States are read from left to right; in the other area, from right to left. In addition, the demand and supply functions for the rest of the world are offset vertically in relation to those in the United States by an amount O A which represents the per unit costs of transferring (tariffs, transportation, etc.) the product between the two areas.

In the absence of trade between the two areas, price and the quantity consumed in each country would be determined by the intersection of the internal supply and demand function in each area. At any price less than the internal equilibrium price O P in the United States, demand exceeds supply in the amount represented by the "excess demand" function P E_d. At any price above the "no trade," internal equilibrium price A P_1 in the other area, supply will exceed demand in the amount represented by the excess supply function P_1 E_s.

In the presence of trade under conditions of a perfect market and profit maximization, the equilibrium price will differ between the two areas by an amount equal to per unit transfer costs. In Figure 7, equilibrium in the presence of trade will be determined by the intersection of the excess supply and demand functions. The equilibrium price will be O P' in the United States and A P' in the other area, the difference being equal to O A, the per unit costs of transfer. At this equilibrium, the United States would import a quantity, Q_1 Q_2, consume a total quantity, O Q_2, and prices to domestic producers would decrease from the no-trade equilibrium price of O P to O P'. In the other area, exports would total Q_3 Q_4 (equal to United States imports),

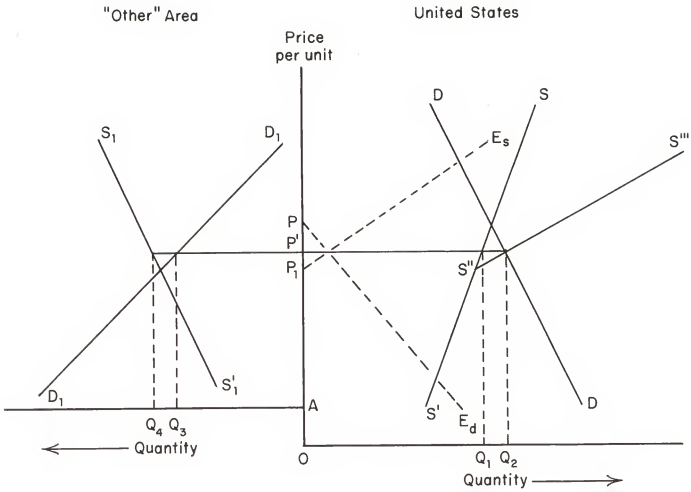

Figure 7. Hypothetical International Walnut Trade Model

internal consumption would total A Q_2, and price to domestic producers would rise from the no-trade equilibrium price of A P_1 to A P'.

Under the conditions depicted in Figure 7, the price and gross income received by domestic producers in the United States are dependent upon the United States demand for and the total supply of the product in the United States. The total supply function in the United States is the sum of the domestic supply function, S' S, and the "excess supply" function, P_1 E_s, which indicates the volume of the product which would be imported into the United States at various prices in the United States, ceteris paribus. The total supply function is depicted by S' S'' S''' in Figure 7.

With the foregoing as the basic economic model, the remainder of this part is devoted to the reporting and discussion of the results of statistical analyses.

Empirical Results

The demand relationships for shelled walnuts in the United States, based upon data for 1926-1961 but excluding the years 1943-1946, are:

(1) $$\hat{X}_1 = -1.32080 - 0.00038X_2 - 0.08076X_3 - 0.03141X_4 + 0.53738 \log X_5$$
$$(0.00004) \quad (0.06644) \quad (0.01436) \quad (0.10178)$$
$$- 0.00286X_6 - 0.03025X_7$$
$$(0.00152) \quad (0.01793)$$
$$R^2 = 0.86065$$

where

$\hat{X}_1$ = estimated annual per capita acquisitions of shelled walnuts in the United States from Pacific Coast handlers and from imports, in pounds.

X_2 = season average price (deflated) of shelled walnuts, f.o.b. Pacific Coast, in cents per pound.

X_3 = annual per capita acquisition of in-shell walnuts in the United States from Pacific Coast handlers and from imports, in pounds.

X_4 = annual per capita supply (weighted) of other domestic and imported tree nuts in the United States, in pounds.

X_5 = annual per capita real disposable personal income in the United States, in dollars.

X_6 = a trend variable (time) with years in the time series numbered consecutively, beginning with 1926.

X_7 = a demand "shifter" with the years 1926-1942 assuming a value of zero and the years 1947-1961 a value of one.

The figures in parentheses are standard errors of the regression coefficients. Data employed in the analyses are contained in Appendix Table 22.

Demand as measured in the foregoing statistical analyses is intermediate to that at the producer and final consumer levels of the shelled walnut marketing system. It reflects, in large part, the demand faced by Pacific Coast handlers of shelled walnuts. As posited in the hypothetical trade model of the preceding section, it was assumed in the statistical analyses that domestic and imported shelled walnuts are a perfectly homogeneous product and that the f.o.b. price of shelled walnuts at the Pacific Coast handler level was representative of the price at which imported shelled walnuts moved into consumption in the United States.

It was further assumed that the United States short-run (a single year) supply function for shelled walnuts was sufficiently inelastic to warrant its treatment in this analysis as predetermined with respect to price in a single year. For reasons discussed previously, this assumption may not be, in reality, fulfilled completely.[1/] However, preliminary efforts at deriving a short-run supply relation using combinations of several variables which were thought might influence short-term supply failed to indicate the existence of any statistically significant relationship between the supply of shelled walnuts in a given year and price in the same year.[2/]

Price, rather than acquisition of shelled walnuts, was treated as an independent variable in the multiple regression analysis on the basis of considerations concerning the structure and marketing procedures of the industry.[3/] Of the remaining variables treated as predetermined with respect to consumption of shelled walnuts, all would seem to accord with that treatment with the possible exception of the variable pertaining to per capita consumption of in-shell walnuts (X_3). Because of possible interdependence in demand between shelled and in-shell walnuts, derivation of simultaneous demand equations for

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1/ See page 46.

2/ The lack of a statistically significant relationship between these variables does not disprove the existence of a positively sloped supply function; it may indicate simply that such a relationship cannot be measured from the date employed in the analysis.

3/ See pages 44 and 45.

the two product forms might have been warranted. However, because of data and other limitations attending such an analysis and the fact that preliminary analyses conducted previously by the author failed to uncover statistical evidence of such interdependence, it was decided to treat per capita acquisition of the in-shell product as predetermined for the purposes of this report.

The foregoing demand equation was also derived independent of the import response function reported subsequently. Preliminary efforts at simultaneous solution of the two equations yielded coefficients which in terms of magnitude and sign seemed implausible on logical and theoretical grounds.

For the predictive purposes of this report, equation (1) seems satisfactory despite the econometric reservations which attend it. Used carefully and with cognizance of its shortcomings, it can be useful for short-run purposes of prediction, if not for derivation of longer run structural demand coefficients.

The effects of changes in the independent variables upon per capita acquisition of shelled walnuts as indicated in equation (1) are:

1. A change of 1 cent per pound in the season average f.o.b. price of Pacific Coast shelled walnuts is associated with, on the average and by itself, a change in the opposite direction in United States per capita acquisitions of all shelled walnuts of 0.00038 pounds per year. Considered over the current United States population of about 185 million, a 1-cent change in f.o.b. walnut prices might change total acquisitions of all shelled walnuts by 70,300 pounds.

2. A change of 1/10 pound in United States per capita acquisitions of all in-shell walnuts is associated with, on the average and by itself, a change in the opposite direction in United States per capita acquisitions of shelled walnuts of 0.00808 pounds per year. This indicates that in-shell and shelled walnuts substitute for each other in the ratio of about 12:1. Considering that the principal competitive use of the two product forms are in direct use in households, that substitution ratio may be reasonable. Consumption of in-shell walnuts is highly seasonal--Thanksgiving and Christmas. For that particular use, shelled walnuts may compete very little. The principal household use of shelled walnuts may be in baking--a use for which in-shell walnuts may compete very little because of the "convenience" aspects of the shelled product.

3. A change of 1/10 pound in the United States per capita supply of other tree nuts is associated with, on the average and by itself, a change in

the opposite direction in United States per capita acquisitions of shelled walnuts from Pacific Coast handlers of 0.00314 pounds per year. This coefficient indicates that "other" tree nuts in the aggregate compete less closely with shelled walnuts than do in-shell walnuts. There is no basis by which the rate of substitution of a particular tree nut, say, shelled pecans, with shelled walnuts can be estimated from this analysis. The coefficient for this variable is not significant statistically at the .05 probability level. That condition, combined with the fact that in construction of the aggregate weighted supply for other tree nuts it was impossible to obtain data pertaining to shelled supply of some of these nuts in several of the years included in the analysis, precludes drawing conclusive statements concerning substitution ratios of those nuts with shelled walnuts.[1/]

4. A change of 10 percent in United States per capita annual real disposable personal income is associated with, on the average and by itself, a change in the same direction in United States per capita acquisitions of all shelled walnuts of 0.02247 pounds per year.

5. The variable X_6 indicates the trend or average annual change in per capita acquisitions of all shelled walnuts in the United States in the period 1926-1961 apart from the influence of other independent variables included in the regression analysis. On the average, per capita acquisitions have been declining at the rate of about 0.003 pounds per year--a relatively small decline in relation to the absolute level of per capita consumption during the years 1926-1961. The apparent slight downward trend in per capita acquisitions may have resulted from the comparatively high level of consumption in the forepart of the time series. As discussed previously and as is readily apparent from examination of the time series, decreased per capita consumption of imported shelled walnuts has been almost completely offset by increased per capita consumption of domestically produced shelled walnuts.[2/]

6. Examination of the time series data indicated the possibility of a relatively abrupt change in the level of per capita acquisition between the

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1/ See Appendix Tables 14-21.

2/ See Figure 3 and Appendix Table 11.

prewar and postwar period of 1943-1946. In order to provide for that possibility as opposed to the longer run, continuous trend in the per capita consumption data which were reflected in X_6, a discrete demand shifter (X_7) was incorporated in the analysis. The negative sign of the coefficient of this variable indicates the possibility of a downward shift in average annual per capita acquisitions in the years 1947-1961. However, the coefficient is not significant statistically at the 0.05 probability level.

In order to derive an "excess supply" function as suggested in Figure 7, it would be necessary to first derive internal supply and demand functions for each of the foreign countries engaged in trade in shelled walnuts. The absence of relevant data precluded quantification of those relationships. However, a function in which United States aggregate imports of shelled walnuts were regarded as dependent upon the price of walnuts in the United States and other specified variables was derived by the least-squares multiple regression technique. Within the strict definition of the term as used in Figure 7, the derived function cannot be termed an "excess supply" function. Supply and demand functions in the foreign countries included in the analysis may have been shifting during the years included in the analysis--shifts which could only be imperfectly accounted for in the empirical analysis. For this reason the derived function may be described more properly as an "import-response" function--a "mongrel" reflecting reactions of foreign suppliers of shelled walnuts to changes in United States shelled walnut prices.

The import-response equation for the period 1931-1961, excluding the years 1941-1947, is:

(2) $$\hat{X}_1 = -0.03834 + 0.00078X_2 - 1.20467X_3 + 0.00032X_4 - 0.00071X_5$$

$$(0.00031) \quad (0.34921) \quad (0.00020) \quad (0.00061)$$

$$R^2 = 0.62640$$

where

$\hat{X}_1$ = estimated United States annual per capita imports of shelled walnuts for consumption from countries other than China, in pounds.

X_2 = season average price of shelled walnuts, f.o.b. Pacific Coast, in cents per pound.

X_3 = United States annual per capita imports of shelled walnuts for consumption from China, in pounds.

X_4 = annual total foreign commercial production of walnuts in countries other than China, in thousands of tons, in-shell.

X_5 = trend variable (time) with years in the time series numbered consecutively, beginning with 1926.

The figures in parentheses are standard errors of the regression coefficients. Data employed in the analysis are contained in Appendix Table 22.

Because production data for China are unavailable for those years included in the analysis, certain adjustments and modifications of variables were necessary. The dependent variable (X_1) was so prepared for regression analysis as to exclude United States imports from China. This made it possible to regress foreign production of walnuts (X_4) against United States imports of shelled walnuts from countries for which production data were available. United States imports of shelled walnuts from China were treated as an independent variable regressed against United States imports from other countries.

Because of the relatively low explanatory value of equation (2) and the dominant position of China as a supplier of shelled walnuts prior to World War II and its demise as a supplier to the United States after 1961, an additional equation was derived for the years 1948-1961 only.

$$(3) \qquad \hat{X}_1 = -0.06021 + \underset{(0.00032)}{0.00080X_2} - \underset{(0.44948)}{1.07207X_3} + \underset{(0.00028)}{0.00067X_4} - \underset{(0.00094)}{0.00216X_5}$$

$$R^2 = 0.76166$$

where $\hat{X}_1$, X_2, X_3, and X_4 are defined as above but relate to the years 1948-1961 and X_5 is a trend variable (time), beginning 1948.

The continuance of China as a supplier of shelled walnuts in 1948-1950 necessitated the definition of X_1, X_3, and X_4 in the same manner described above for equation (2). However, in contrast to the time series employed in deriving equation (2), China appears as an exporter of shelled walnuts to the United States in only two years and as a substantial exporter in only one year of the postwar time series. Thus, equation (3) comes much closer to estimating United States imports from all foreign nations than does equation (1).

Statistically, the coefficient of determination is moderately higher in (2) than in (1); each of the regression coefficients in (2) is significant statistically at the 0.05 percent probability level, and the magnitude of the variable X_3 seems more reasonable in (2) than in (1).

In addition to the two equations reported above, several alternative formulations, including other variables in various combinations with those above were derived for each of the two time series. Other variables utilized

included the price of foreign shelled walnuts as represented by the declared value of imports into the United States, the ratio of foreign to United States price for shelled walnuts, United States per capita acquisitions of shelled walnuts from Pacific Coast handlers, and, in the case of the 1926-1961 time series, a "prewar-postwar shifter." None of the alternative regressions provided a better "fit" to the time-series data than the two specified above; several were less acceptable for statistical or economic reasons.

The estimated effects of changes in the independent variables specified in equations (2) and (3) upon United States imports of shelled walnuts are:

1. A change of 1 cent per pound in the average annual f.o.b. price of Pacific Coast shelled walnuts is associated with, on the average and by itself, a change in the opposite direction in annual United States per capita imports of shelled walnuts, from countries other than China, of 0.0008 pounds. The regression coefficient for the price variable (X_2) is approximately equal in the two import-response equations. At the current United States population of 185 million, a 1-cent change in the f.o.b. price of Pacific Coast shelled walnuts might result in an opposite change in United States shelled walnut imports of 150,000 pounds per year apart from changes in imports induced by changes in other variables. It is important to note that a given change in the f.o.b. price of Pacific Coast shelled walnuts is associated with a larger change in the volume of imports than in the volume of shelled walnuts acquired in the United States from Pacific Coast handlers; the respective regression coefficients are 0.0008 and 0.0004. Expressed differently, it appears that the price elasticity of import response is higher than the price elasticity of demand for Pacific Coast shelled walnuts.

2. A change of 1/10 pound in United States per capita imports of shelled walnuts from China is associated with, on the average and by itself, a change in the opposite direction in annual United States per capita imports of shelled walnuts, from countries other than China, of approximately 1/10 pound [equation (3)]. As would be expected, imports of shelled walnuts from the two areas substitute approximately 1:1. In using the import-response function to predict imports in a future year, X_3 assumes a value of zero because of the United States prohibition of trade with China.

3. A change of 1,000 tons, in shell, in the annual total commercial production of walnuts (in-shell basis), in countries other than China, is associated with, on the average and by itself, a change in the same direction in

annual United States per capita imports of shelled walnuts, from countries other than China, of 0.00032 pounds. Considering the fact that annual variation in foreign production has been as much as 20,000 tons and that total foreign production averaged 73,000 tons in 1948-1961, this variable appears to have affected importantly both the general level of and annual variations in the annual volume of shelled walnuts imported into the United States.

4. As indicated by the regression coefficient for the trend variable X_5, United States annual per capita imports of shelled walnuts have trended downward in the period 1948-1961 and in the longer run period, 1926-1961. The average annual rate of decline during the latter period was 0.00071 pounds per capita. As discussed in Part I, the first half of that period was one in which the shelling of walnuts in the United States was small in volume. Even in the late 1930's, the shelled sector of the walnut industry was in its commercial infancy. The postwar period 1958-1961 was, however, one marked by rapid expansion in production of shelled walnuts in California. As this expansion occurred, United States per capita imports of shelled walnuts have declined at a more rapid rate (0.00216 pounds per year) than during the 1926-1961 period as a whole. However, population increase in the United States has largely offset declining per capita consumption since 1948, although it has not been sufficient to prevent a secular decline in total imports since 1926.1/

Although the import-response functions presented in this report have accounted for a substantial part of the year-to-year variation in United States per capita imports of shelled walnuts, it seems evident that variables other than those available for the empirical analysis may also affect United States imports. A larger proportion of the annual variations in imports might have been explained had a time series of foreign prices of shelled walnuts been available. Possibly, some measure of demand for shelled walnuts in foreign countries also would have proved helpful had it been available for inclusion in the regression analysis. In addition, there may be substantial errors of measurement in some variables, particularly foreign walnut production, which have precluded measurement of the "true" effect of those variables which are included in the analysis.

For reasons already mentioned explicitly, both the demand- and import-response functions must be used cautiously for purposes of prediction. The

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1/ See Figure 3 and discussion.

various coefficients derived by regression analyses apply "on the average" over the range of data included in the analysis; they should be used judiciously for purposes of prediction in a single year and when applied to data outside the range included in the analysis. Because economic relationships are subject to structural changes over time, the results of this analysis are applicable principally within a short-run context.

PART IV: THE ECONOMIC IMPLICATIONS OF TARIFF REDUCTIONS

The basic authority by which the President may modify the United States tariffs is contained in Public Law 87-794 (Trade Expansion Act of 1962). Title II, Chapter I, Section 201(b)(1), of that Act specifies: "Except as otherwise provided in this title, no proclamation pursuant to subsection (a) shall be made . . . (1) decreasing any rate of duty to a rate below 50 percent of the rate existing on July 1, 1962." Section 253, Title II, requires that tariff reductions granted by the President shall, in effect, be applied in five equal annual installments.

If the maximum reduction of 50 percent were to be applied to the July 1, 1962, United States tariff on shelled walnuts, the duty would decline by 7.5 cents per pound.[1/] Applied equally over five years, that would mean an annual reduction of 1.5 cents per pound. The economic effects of such tariff reductions upon the United States walnut industry are assessed in the sections which follow.

Estimated Economic Effects of Tariff Reductions

From an economic viewpoint, a reduction in tariff may be considered as a decrease in exporters' costs of supplying walnuts to the United States; reciprocally, it may be considered as an increase in the "effective" selling price of foreign walnuts in the United States. The nature of economic adjustments which might be generated by a tariff reduction can be visualized by reference to the economic model diagrammed as Figure 7.

A reduction in a specific tariff (a constant charge per unit of the product imported) such as that which applies to shelled walnuts and as assumed in Figure 7 would have the effect, ceteris paribus, of reducing by an equal amount the vertical displacement of the supply and demand functions contained in the left side of Figure 7. Such displacement would in turn have the effect of causing the excess supply function $P_1 E_s$ to intercept the Y axis at a price lower than P_1 by the amount of the tariff reduction. Similarly, the segment S'' S''' of the aggregate United States supply function would be shifted downward by the amount of the tariff reduction, causing imports to increase,

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1/ See Table 9.

domestic supply to decrease, and price of the product in the United States to decrease. It should be noted that the extent of the price decline in the United States would be dependent directly upon the slope of the United States demand function in its relevant section. Under the conditions visualized in Figure 7, there would necessarily be a decline in the gross income received by United States producers of the product; a reduction occurs in both the price received and in the quantity of the product supplied by domestic industry. For any given decline in price, the loss of gross revenue to United States producers would be inversely related to the slope of the domestic supply function. Given a perfectly inelastic domestic supply function, the loss in gross revenue would be entirely dependent upon the price elasticity of United States demand in the relevant part of the demand function.

It is also apparent from Figure 7 that shifts in the demand for or supply of walnuts in either the United States or in nations exporting the product would modify the price effects of the tariff reduction as discussed above within a static context. Thus, in considering the price which might prevail for shelled walnuts during the five years in which such reductions would be effectuated under provisions of the Trade Expansion Act, it is also necessary to consider the probability and magnitude of potential shifts in the relevant demand and supply function. Among such considerations is the extent to which the domestic industry might be able to dampen the possible initial adverse income effects of a tariff reduction on shelled walnuts by allocation of the total domestic supply of walnuts among shelled and in-shell markets.

In reality, the adjustments of both domestic and foreign suppliers of walnuts to a reduction in United States tariffs on shelled walnuts are not likely to occur in the regular, systematic, and instantaneous manner implied in the model depicted in Figure 7. Knowledge is less than perfect: uncertainty rather than certainty prevails; adjustments in the production plant may be difficult and slow to be accomplished. A reduction in tariffs in one year, followed by the adjustments visualized in Figure 7 which lead to de facto changes in the price of shelled walnuts in the United States, may tend to reduce imports in the succeeding year. Thus, the effect of a tariff reduction in a single year may induce a series of short-run adjustments and readjustments in the price and in quantities supplied by both domestic and foreign producers.

The empirical analyses of demand for and imports of shelled walnuts presented in the foregoing section provide a basis for estimating a part of the short-run effects of United States tariff reductions. Equations (2) and (3) indicate that a tariff reduction of 1.5 cents per pound might increase United States imports by 0.00120 pounds per capita or, with a United States population of 185 million, about 222,000 pounds in total in the year following the tariff reduction. Such an increase represents the independent effect of the tariff reduction. Changes in other variables included in the equations (foreign production, de facto changes in f.o.b. price, a continuation of the trend in per capita acquisitions) may be affecting simultaneously the volume of imports, and, depending upon the direction and magnitude of those changes, the tendency to increase imports as a result of the tariff reduction may be offset or supplemented. However, it is the partial or independent effect of the tariff reduction which is of prime concern at this point.

Although the absolute increase in imports generated by the tariff reduction seems small [equation (1)], the short-run price and income effects on the domestic industry might be appreciable.

Given an increase of 222,000 pounds in the first year following the tariff reduction, the domestic industry might have to reduce price on its entire sales volume by 3.2 cents per pound in order to market the same quantity of shelled walnuts as without a tariff reduction. This assumes no change in the level of United States demand from changes in per capita income, population, or other independent variables contained in equation (1). Under those assumptions and at the average movement of 32 million pounds of domestic shelled walnuts during the past five years, the income loss attributable directly to the tariff reduction would total slightly more than $1 million in the first year after the reduction. With a sales volume at the 35.8 million pounds of the 1962-63 marketing year, the income loss to the domestic industry might total $1.132 million. Of course, as suggested above, in the theoretical terms, a price reduction on the part of the domestic industry might then suppress imports and lead to the sequential types of adjustments discussed previously. There is no way of knowing whether and, if so, how rapidly or completely those kinds of adjustments would occur in the course of, say, a single year. To whatever extent the sequential adjustments referred to above take place in the course of the first year, income loss resulting from tariff reductions for the domestic industry probably would be less than $1 million.

How much less cannot be determined quantitatively, although it seems reasonable to expect that losses would not be reduced greatly from those estimated above.

The maximum authorized annual tariff reduction of 1.5 cents per pound is not large relative to f.o.b. prices of shelled walnuts which have prevailed in recent years.[1/] Even the annual variation in f.o.b. prices of recent years exceeds substantially the possible annual reduction of 1.5 cents. It is not unexpected that this relatively small reduction in tariffs would result in comparatively moderate adjustments in the volume of imports and domestic prices and income in the short run. However, this does not deny that a series of five reductions of 1.5 cents each would not result in very substantial price and income effects upon the domestic walnut industry. If changes induced directly by tariff reductions were the only changes occurring during the five years in which reductions were to be applied, a maximum loss of about $5 million in terms of foregone income might accrue to the shelled walnut sector of the domestic industry. To some extent, losses might be reduced below $5 million. During five years, it seems reasonable to expect that many of the sequential adjustments referred to above could take place. Increased imports and lower domestic prices in one year might tend to offset to some extent the tendency for increased imports resulting from tariff reduction in the immediately succeeding year. For reasons similar to those stated above, one cannot be sure that such adjustments will occur and, if so, to what extent. In addition, total demand for shelled walnuts in the United States may be expected to increase if population and real per capita income continue to rise at the rate of recent years. Compared to current total consumption, the combined effect of these two variables could be to increase demand for shelled walnuts by approximately 9 percent in the next five years.[2/] Based upon the projections specified in Part II, projected increases in demand for shelled walnuts would be about equal to projected increases in United States total production of

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1/ See Appendix Table 13.

2/ Assuming an annual increase in United States population of 1.2 percent per year from the current population of nearly 185 million and a 3 percent increase in real per capita income. The income effect was derived from the estimated income coefficient contained in equation (1). It was assumed that there would be no change in the relative price of walnuts and other tree nuts and no change in consumer tastes and preferences for tree nuts during the next five years.

walnuts.[1] Considering all these matters, it is conceivable that total income loss to the shelled walnut sector of the industry solely as a result of tariff reductions of the magnitude and nature authorized in the Trade Expansion Act might range between $4 million and $5 million over the five years of tariff reductions. However, for reasons enunciated above, it must be admitted that such an estimate of loss is, in part, subjective.

The foregoing estimates of short-term losses to the domestic walnut industry from tariff reductions on shelled walnuts have involved the assumption of a highly inelastic supply of domestic shelled walnuts for sale in their primary market outlets. In a short-run context, that seems to be a reasonable assumption; once shelled, there is little that can be done with walnuts other than selling at whatever price they will bring in the usual commercial markets or diverting to other, usually lower price markets such as the export market or to crushing outlets for the manufacture of oil or storing for sale at a later time. In the longer run, however, a decline in shelled walnut prices could lead to reallocation of the walnut crop between in-shell and shelled product markets. This might be accomplished through operation of the federal marketing order or by handlers acting individually to maximize their profits from sale of walnuts. Thus, there are two questions at issue with respect to the indirect effects of a reduction in the shelled walnut tariff: (1) in the short run where the supply of domestic shelled walnuts is fixed, would a price decline for the shelled product in turn induce users of walnuts to substitute shelled for in-shell walnuts, thereby inducing a price decline for the latter product? and (2) in the longer run where walnuts may be allocated between the two markets in accordance with their relative prices, what would be the net total effect on the domestic industry of a tariff reduction on shelled walnuts? The first question hinges primarily on the cross-elasticity of demand for the two product forms; the second question involves consideration of the relative magnitude of each product's "own" price elasticity, as well as cross-elasticities of demand. Definitive, empirical answers to those questions cannot be provided at this time; the best that can be done is to present certain suggestive evidence bearing upon the questions.

1/ See pages 42-44 for production projections.

With respect to the first question, it should be recalled that perhaps less than 50 percent of domestic shelled walnuts is marketed in outlets where they might compete conceivably with in-shell walnuts. Of that 50 percent, only some portion thereof may actually compete with the in-shell product because of differences in seasonal marketing patterns, differences in use in the households, product convenience, etc.[1/] Thus, one might expect that small relative changes in the price of shelled walnuts at the retail level would not induce consumers (households) to make any substantial substitution between the two product forms. If that be true, buyers intermediate to the retailer and the handler at the f.o.b. level seem no more likely to substitute between the two product forms on the basis of small changes in relative prices.

There is the possibility that confectioners and bakers who acquire most of the shelled walnuts not sold for direct use in households would purchase in-shell walnuts for shelling themselves if the price differential between the two product forms is very wide. However, with the range of quality of shelled walnuts available and with the economies of scale which logically may attend shelling operations, this seems an unlikely possibility, at least in any significant volume.

Statistical evidence from equation (1) suggests a very low substitution rate between in-shell and shelled product forms--12:1.[2/] Thus, on both the grounds of logic and suggestive statistical evidence, it seems that the cross-elasticity of demand for the two product forms at the handler level may be very low. If this is, in fact, correct, one might expect a short-term, small decline in prices of shelled walnuts to generate--by itself--only very small changes in quantities of in-shell walnuts acquired from Pacific Coast handlers. Thus, the impacts of a tariff reduction on shelled walnuts would be confined principally to the shelled walnut sector of the industry. It must be admitted, however, that further research is necessary before that hypothesis can be tested.

In the absence of a demand analysis for in-shell walnuts, nothing can be said definitively concerning the economic efficacy of attempts which the industry might make to allocate walnut supplies between in-shell and shelled

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1/ See pages 47-49.

2/ Page 54.

products if tariff reductions induced a persistent increase in imports and decrease in domestic prices of shelled walnuts. Depending upon the relative price elasticities of demand, the industry might be able by management of supplies entering the two markets to offset losses which would otherwise be incurred. Yet, the very character of use upon which in-shell walnuts depends so heavily (holiday trade) suggests that demand for that product form might be more inelastic with respect to price than in the shelled form. And recent trends in per capita and total consumption of the in-shell product offer little encouragement that total demand will expand substantially at least during the remainder of this decade.[1/] Until further research is conducted, one can only surmise that the possibilities of offsetting any substantial part of economic losses which might initially accrue in the shelled sector as a result of tariff reduction are very limited.

Because of the availability of appropriate and more complete data, the foregoing analyses and estimates of the economic impacts of tariff reductions for shelled walnuts have been focused upon the handler or f.o.b. price level of the marketing system. There remains the question of what extent prices and income received by walnut producers would be affected by the changes in price and income just estimated for handlers.

Given the particular structure of the walnut industry, it seems reasonable to expect that a large part of the reduction in f.o.b. price would be reflected backwards to walnut producers. The single largest marketing organization in the industry is a grower-owned cooperative.[2/] Price changes experienced by the cooperative in marketing walnuts could only be passed back to its producer members. There is suggestive statistical evidence that changes in the annual average f.o.b. price for shelled walnuts have, in fact, been reflected backwards to prices at the producer level. In the period 1926-1961, excluding the years 1943-1946, the simple correlation between annual average f.o.b. price for shelled walnuts and annual average price received by growers for walnuts (in-shell basis) at first delivery points, is 0.86; for the years 1948-1961, the correlation coefficient is 0.83.[3/] Although those correlated

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1/ See Appendix Tables 11 and 12.

2/ See page 44.

3/ Price data from which the correlation coefficients were derived are contained in Appendix Table 13.

movements in the two price series do not indicate necessarily the existence of a "cause and effect" relationship between the two variables, they do lend support to the hypothesis that a tariff reduction which would lead to reduction in f.o.b. prices of Pacific Coast shelled walnuts would be passed ultimately back, in large part, to the producers of walnuts.

Some Further Implications of Tariff Reductions

Estimates of the independent effects of tariff reductions upon the volume of shelled walnuts imported into the United States, the f.o.b. price of domestically produced shelled walnuts, and the income received by the shelled walnut sector of the Pacific Coast have been presented and discussed in foregoing sections of this report. In brief, it was concluded that tariff reductions of the magnitude and in the manner authorized under the Trade Expansion Act of 1962 might, by themselves, result in a moderate increase in the volume of United States imports and moderate decreases in prices and income in the domestic industry during the five-year period in which the tariff was being reduced. In addition to the direct economic effects of tariff reduction, there are possibilities of certain "side effects" which should not be overlooked. And, because future economic conditions in the walnut industry will be influenced not only by the level of United States tariffs but also, and likely more importantly, by other economic determinants such as the level of walnut production and demand, there is need to summarize and recapitulate the highlights of the possible or probable economic context within which tariff reductions might be granted.

The substantial annual variations which have occurred in world production of walnuts have been discussed previously.[1/] In addition, it has been demonstrated that the volume of United States imports of shelled walnuts is positively correlated with changes in the volume of foreign walnut production.[2/] It is possible that United States tariff reductions could increase the already substantial variation in U. S. import volume generated by the production variations just referred to. Increased variation in imports might occur

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1/ Pages 15-17.

2/ Equations (2) and (3).

because of the sequence of adjustments which might be expected to follow tariff reduction.[1/] Such variations or the failure to anticipate correctly the timing and magnitude of sequential adjustments induced by the tariff reduction might compound the already appreciable inventory management problems in several parts of the walnut marketing system. Such variations might even lead to errors in production planning in both the United States and abroad. Conceivably, industry efforts to reduce interseasonal supply variations through operation of the federal marketing order could be made less effective or the objectives of such a program made more difficult and costly to attain if variability of imports was increased. Thus, even if underlying price and income effects of a tariff reduction were small, the increased variability and uncertainty which might accompany the reduction could have important consequences for the domestic industry.

The future economic conditions in the walnut industry will be determined by a large number of factors which influence the supply of and demand for walnuts. Whether the United States tariff on shelled walnuts remains at 15 cents or is reduced to 7.5 cents per pound is but one of many questions of importance to the walnut industry. Even if the independent-of-incremental effects of a tariff reduction were small, it is the combined effects of all relevant variables which determine the economic circumstances prevailing in the industry at any given time. It would be little consolation to individuals in the industry to know, for example, that the independent effects of a tariff reduction would be small if at the same time, but for other reasons, prices and incomes were being depressed. Similarly, there might be less unfavorable inclination toward a tariff reduction if it was apparent that foreign production and available foreign exportable supplies were decreasing significantly. It is proper and important, therefore, that the effects of tariff reductions be considered in conjunction with other matters of relevance in the determination of economic conditions of the walnut industry. It is, of course, impossible to forecast with certainty the future course of all variables which appear to bear upon economic conditions in the walnut industry. Given certain assumptions, it is possible to make useful projections of a few critical variables.

1/ Pages 65-66.

Projections of demand for and production of walnuts in the United States have already been made and need not be restated beyond noting that the projected increase in demand is about equal to the projected increase in total walnut production in the next five years.[1] Whether prices of other tree nuts produced domestically will remain stable on the average is impossible to know. There is some indication of a potential increase in average production of pecans and almonds; filbert production may continue at or near the current level.[2] The foreign production potential for walnuts also seems likely to increase or at least not diminish during the next several years.[3] However, foreign consumption of walnuts may also increase appreciably during the same period, leaving supplies available for export to the United States at levels about equal to the average of recent years.[4]

On the basis of these various projections, a reasonably balanced growth in world production and demand for walnuts seems possible during the remainder of this decade. But, it is also possible and, on the basis of the past, even probable that there will be years of abnormally large and small production in the major walnut-producing countries of the world. These fluctuations, uncorrelated with market demand for walnuts, can induce large variations in price and income in the country of production and, by inducing changes in the volume of walnuts available for export, induce price and income variation in other countries. These unstable conditions in production and trade rather than the emergence of a basic longer run imbalance between production and demand are likely to be the source of the major economic problems in international marketing of walnuts during the remainder of the 1960's. Certainly, unilateral tariff reductions on the part of the United States will not ameliorate appreciably those kinds of economic problems; as discussed previously, tariff reduction might accentuate such instability and attendant uncertainty.[5]

1/ See pages 44 and 66.

2/ See Appendix Tables 16-18 and Farrell and Rush, op. cit., p. 20.

3/ See page 36.

4/ Pages 37-38.

5/ Page 71.

Given the inelastic nature of domestic demand and the positive correlation between foreign production of walnuts and the volume of shelled walnuts imported into the United States, short-term changes in foreign production could induce disproportionately large changes in domestic prices and income.[1] Tariff reductions, depending upon the direction of change in foreign production, could supplement or offset partially the domestic price and income effects of the change in foreign production. Although there is no means by which the time of occurrence or the magnitude of such production variations can be forecast reliably, the possibilities of tariff reductions reinforcing unfavorable economic effects of such variations should be recognized.

Statistical analyses reported previously indicate that, apart from the influence of other variables, there has been a downtrend in United States per capita imports of shelled walnuts.[2] Whether this is indicative of a change in buyer preferences in favor of domestic shelled walnuts, and, if so, whether such a trend will persist into the future, cannot be determined on the basis of this analysis. The trend variable included in the regression analyses of imports may be reflecting merely the net result of a number of other variables which could not be quantified and included in the analyses. Certainly, the domestic industry has made a number of important changes in the marketing and distribution of shelled walnuts to assure more uniformity in quality characteristics of the domestic product. A variety of household packs have been introduced and have been accompanied by substantial expenditures for private brand promotion and advertising. Yet, it seems probable that in those outlets where shelled walnuts are a single ingredient in the manufacture of a consumer product (bakery goods and confectionery products) imported shelled walnuts continue to compete strongly with the domestic product.[3]

In summary and conclusion, it is apparent that future economic conditions in the Pacific Coast walnut industry will be determined by a large number of

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1/ See equations (1), (2), and (3) and discussion concerning interpretation of those equations.

2/ Page 61.

3/ U. S. Agricultural Marketing Service, Marketing Tree Nuts: Trends and Prospects, Marketing Research Report No. 139, 1956, p. 9.

variables. It is also apparent that the volume of United States shelled walnut imports, which itself is influenced by a number of variables, some of which are external to the United States, is but one of those determinants of economic conditions in the domestic industry. The level of the United States tariff on shelled walnuts does apparently influence the volume of imports and thereby prices and income received by handlers and producers of the domestic product. Tariff reduction of the magnitude and in the manner authorized in the Trade Expansion Act of 1962 would tend to increase imports and, by itself, would tend to reduce prices and income received in the Pacific Coast walnut industry. However, such effects are likely to be moderate in magnitude and could either supplement or offset partially the effects of other variables operating simultaneously to determine prices and income in the industry. There is the possibility that "side effects" of tariff reduction could accentuate the already substantial annual variation which characterizes world production and trade in walnuts and which is the source of inventory management problems both here and abroad.

Obviously, the domestic walnut industry will not gain from unilateral reduction in the United States tariff for shelled walnuts; the foregoing analyses have demonstrated otherwise. To the individuals so affected, any uncompensated reduction in price and income may seem "unjust" or "inequitable." The questions of equity and compensatory income transfers have not been engaged in this report. This is not to deny, however, that such questions are relevant to adversely affected industries and to officials charged with conducting trade negotiations; obviously, they are or should be of relevance to both parties. However, in the long run, variables other than tariffs are likely to prove to be the more important determinants of walnut production, consumption, and trade. Much will depend upon the nature of marketing and price policies pursued by individual firms in the domestic industry and by those firms acting jointly through industry-wide marketing programs. Those policies and, particularly, price levels sought by the industry may contribute as much or more to the determination of the future volume of shelled walnut imports and economic conditions in the entire walnut industry as would a reduction in the United States tariff for shelled walnuts.

APPENDIX TABLE 1

Walnuts: Commercial Production in Specified Countries, 1924-1963

Year	France	Italy	Turkey	Yugo-slavia	Rumania	Hungary	Bulgaria	Iran	Syria	Total Mediter-ranean Basin	India	Total specified foreign countries	United States	Total specified foreign and United States
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	short tons, in-shell basis													
1924	61,950	16,550	a/		17,650							96,150	24,650	120,800
1925	70,900	31,300	1,000		33,050							136,250	36,550	172,800
1926	22,000	28,100			28,650							78,750	16,200	94,950
1927	58,300	27,650			13,200							99,150	52,100	151,250
1928	27,450	24,700		2,200	20,950							75,300	27,400	102,700
1929	50,270	17,600	6,050	5,500	6,380	2,310	1,485			89,595		89,595	43,400	132,995
1930	38,340	14,025	9,625	9,625	11,825	4,510	2,640			84,590		84,590	30,300	114,890
1931	51,865	15,400	8,250	8,250	16,500	4,015	2,750			107,030		107,030	34,200	141,230
1932	32,725	14,300	7,700	5,500	6,600	1,100	3,300			81,225		81,225	49,100	130,225
1933	31,350	17,050	8,250	7,700	6,600	1,100	3,300			75,350		75,350	34,000	109,350
1934	46,750	17,875	12,100	8,250	12,100	3,300	4,125			104,500		104,500	47,100	151,600
1935	34,375	21,175	8,250	12,100	11,550	1,815	4,400			93,665		93,665	57,400	151,065
1936	40,700	14,025	5,500	8,250	16,500	3,300	4,950			93,225		93,225	45,800	139,025
1937	44,000	22,550	8,800	5,500	16,500	3,300	4,675			105,325		105,325	62,400	167,725
1938	39,600	13,750	5,500	8,800	13,200	1,100	4,950			86,900		86,900	55,300	142,200
1939	33,000	11,000	11,000	5,500	13,200	1,100	4,620			79,420		79,420	62,500	141,920
1940	41,250	10,450	11,000	4,400	6,050	3,300	7,370			83,770		83,770	50,800	134,570
1941	18,700	12,900	11,600	3,300	2,200	3,850	4,675			57,225		57,225	70,000	127,225
1942	24,090	15,000	8,800	2,200	4,400	2,750	4,950			62,190		62,190	55,750	117,940
1943	12,900	10,900	5,500	1,650	3,300	2,200	4,125			40,500		40,500	63,600	104,100
1944	22,000	13,800	5,500	2,200	1,650	1,925	4,400			51,400		51,400	71,500	122,900
1945	12,100	16,500	2,000	5,060	1,375	1,100	2,200			40,400		40,400	70,700	111,100
1946	10,700	13,200	5,000	4,950	1,100	1,100	3,025			39,100		39,100	71,900	111,000
1947	32,000	14,000	2,200		9,700b/					57,900		57,900	64,500	122,400
1948	13,100	15,400	10,000		11,400b/				3,000	52,900		52,900	70,650	123,550
1949	13,300	27,500	12,000		13,000b/				2,500	68,300		68,300	87,500	155,800
1950	21,300	22,000	7,200	3,700					3,400	57,600		57,600	64,100	121,700
1951	21,600	19,800	9,500	3,500					2,400	76,800		76,800	77,400	154,200
1952	34,200	27,800	4,000	3,600				5,800	4,000	79,400		79,400	83,800	163,200
1953	26,700	7,700	6,900	3,500				7,400	4,100	56,300	7,000	63,300	59,200	122,500
1954	26,500	12,500	5,500	5,800				7,100	2,700	60,100	11,000	71,100	75,100	146,200
1955	33,500	29,000	6,100	6,100				6,800	2,000	83,500	8,000	91,500	77,100	168,600
1956	20,500	39,000	4,200	2,700				4,400	1,300	72,100	9,500	79,600	71,800	151,400
1957	9,500	13,000	3,500	3,000				7,400	2,700	39,100	14,000	53,000	66,600	119,600
1958	29,000	25,000	6,000	4,700				8,800	1,300	74,800	11,500	86,300	88,700	175,000
1959	18,600	22,000	7,300	3,200				8,500	2,500	62,100	9,000	71,100	62,700	137,800
1960	28,000	26,500	9,200	2,200				4,500	2,800	73,200	15,500	88,700	72,800	161,500
1961	20,400	20,000	10,800	4,300				4,200	6,000	65,700	10,500	76,200	67,500	143,700
1962c/	31,000	36,000	7,500	5,000				3,600	6,000	90,100	12,000	102,100	81,400	183,500
1963c/	33,000	22,000	9,000								10,000			

(Continued on next page.)

APPENDIX TABLE 1--continued.

a/ Blanks indicate no data available.

b/ Includes Yugoslavia, Rumania, Hungary, and Bulgaria; countries not reported separately.

c/ Preliminary for all countries except the United States.

Sources:

1924-1946: California Federal-State Market News Service, Foreign Walnut Report (Sacramento, periodic weekly and monthly issues).

1947-1962: U. S. Agricultural Marketing Service, Foreign Crops and Markets, weekly issues.

Idem, World Summaries, Crops and Livestock: Foreign Crops and Markets, Statistical Supplement, monthly issues.

Idem, World Agricultural Production and Trade: Statistical Report, monthly issues.

APPENDIX TABLE 2

Walnuts: United States Exports, by Country or Area of Destination, 1932-1962

Crop Year[a]	In-shell[b]					Shelled[b]				
	Canada	Cuba	Europe	Other	Total	Canada	Cuba	Europe	Other	Total
	thousand pounds									
1932					5,628					
1933					16,527					
1934					3,778					
1935					12,057					
1936					12,403					
1937					10,371					
1938					12,539					
1939					8,790					
1940					3,737					
1941					3,541	8	--[c]	50	101	159
1942	[d]	156	--	325	481	[d]	12	6	73	91
1943	2,048	202	74	118	2,442	4	[d]	--	22	26
1944	2,686	356	--	294	3,336	4	[d]	--	58	62
1945	4,444	468	330	1,025	6,267	179	[d]	[d]	53	232
1946	2,884	430	650	1,064	5,028	178	2	2	58	240
1947	1,496	506	66	1,567	3,635	711	10	--	82	803
1948	596	588	--	557	1,741	289	2	--	103	394
1949	2,442	706	20	697	3,865	18	--	[d]	38	56
1950	2,114	968	128	459	3,669	4	6	--	51	61
1951	1,721	822	--	322	2,865	6	--	--	58	64
1952	2,029	666	[d]	353	3,048	16	--	--	70	86
1953	2,348	470	2,000	291	3,111	10	--	--	91	101
1954	2,944	610	5,808	649	10,011	23	--	--	112	135
1955	2,018	714	--	486	3,218	55	--	--	99	154
1956	1,868	612	154	352	2,986	8	--	--	86	94
1957	2,242	562	671	419	3,894	6	--	--	94	100
1958	2,438	606	6,761	432	10,237	960	--	--	114	1,074
1959	2,569	151	130	371	3,211	24	--	--	159	183
1960	1,706	13	--	508	2,227	61	--	--	89	164
1961	1,536	--	--	388	1,924	93	--	--	139	232
1962	1,452	--	68	460	1,980	54	--	9	161	224

(Continued on next page.)

APPENDIX TABLE 2--continued.

a/ Beginning August 1 except for 1932 and 1933, for which data are reported for year beginning October 1.

b/ Exports prior to 1932 were negligible. Exports of shelled and in-shell walnuts were not separately classified prior to January 1, 1941, nor were they classified according to country of destination. It is believed, however, that exports were predominantly in-shell (U. S. Tariff Commission, Edible Tree Nuts, War Changes in Industry Series, Report No. 18, 1946, p. 46).

c/ Dashes indicate that exports, if any, not reported separately but assumed to be included in "other."

d/ Less than 1,000 pounds.

Sources:

1932-1934: Walnut Control Board, Before the Committee for Reciprocity Information: Proposed Negotiation of Foreign Trade Agreement with France (Washington, D. C.: Press of Byron S. Adams, 1935), 39p.

1935-1941: U. S. Tariff Commission, Edible Tree Nuts, War Changes in Industry Series, Report No. 18, 1946, 66p.

1942-1962: U. S. Bureau of the Census, United States Exports of Domestic and Foreign Merchandise: Commodity by Country of Destination, Report FT 410, monthly issues.

APPENDIX TABLE 3

Walnuts, In-Shell: United States Imports, by Country of Origin, 1920-1962[a/]

Crop year[b/]	Country of origin					Total[c/]
	France	Italy	Rumania	China	Other	
	thousand pounds					
1920	-[d/]	--	--	--	--	14,266
1921	--	--	--	--	--	41,383
1922	8,253	8,478	108	1,591	1,235	19,665
1923	4,820	10,393	125	2,042	1,261	18,641
1924	9,060	11,567	772	6,374	2,780	30,553
1925	8,051	9,395	1,054	2,449	1,688	22,637
1926	3,566	12,082	2,049	5,936	2,250	25,883
1927	2,244	4,558	[e/]	2,530	4,288	13,620
1928	2,720	4,300		4,574	3,606	15,400
1929	830	4,620		1,418	156	7,024
1930	476	2,356		504	217	3,553
1931	1,272	4,141		81	103	5,597
1932	8	1,759		42	429	2,238
1933		2		[f/]	6	8
1934	--	--	--	--	--	30
1935	--	--	--	--	--	315
1936	--	--	--	--	--	73
1937	--	--	--	--	--	254
1938	[f/]	66	54		16	136
1939			22			22
1940					17	17
1941						0
1942						0
1943						0
1944						[f/]
1945					48	48
1946		230			6	236
1947		6		[f/]	1	7
1948		66			1	67
1949		6				6
1950	108				[f/]	108
1951					15	15
1952		71			35	106
1953						0
1954						0
1955	317	48			189	554
1956					100	100
1957					49	49
1958					57	57
1959					102	102
1960		45			27	72
1961					45	45
1962		6				6

(Continued on next page.)

APPENDIX TABLE 3--continued.

a/ General imports unadjusted for reexports in period 1920-1941; thereafter, imports for consumption.

b/ Beginning August 1 except years 1941-1946, for which data are reported for year beginning September 1.

c/ Total may not equal sum of imports from specified countries because of rounding of numbers.

d/ Dashes indicate country of origin not available.

e/ Blanks indicate that imports, if any, not reported separately but assumed to be included in "other."

f/ Less than 1,000 pounds.

Sources:

1920-1930: California Federal-State Market News Service, Foreign Walnut Report (Sacramento, periodic weekly and monthly issues).

1931-1962: U. S. Bureau of the Census (prior to May, 1941, U. S. Bureau of Foreign and Domestic Commerce), Monthly Summary of Foreign Commerce of the United States, monthly issues.

U. S. Bureau of the Census, United States Imports of Merchandise for Consumption: Commodity by Country of Origin, Report FT 110, monthly issues.

APPENDIX TABLE 4

Walnuts, Shelled: United States Imports, by Country of Origin, 1920-1962[a/]

Crop year[b/]	Country of origin												Total
	France	Italy	Turkey	Yugo-slavia	Ruma-nia	Iran	Syria	India	China	Canada	Spain	Other	
	thousand pounds												
1920	--[c/]	--	--	--	--	--	--	--	--	--	--	--	13,335
1921	--	--	--	--	--	--	--	--	--	--	--	--	11,893
1922	14,146	310	d/		294				1,520		585	994	17,849
1923	15,426	132			71				1,770		1,080	383	18,862
1924	16,854	750			203				3,631		1,034	1,151	23,623
1925	17,834	391			507				2,973		759	668	23,132
1926	8,588	328			699				8,029		595	3,011	21,250
1927	11,147								1,879			2,834	15,860
1928	9,210								5,059			3,617	17,886
1929	11,070	286	252						4,340	440	358	299	17,045
1930	4,604	254	1,006		838				8,252	374	194	295	15,817
1931	5,194	276	92		328				4,114	110	296		10,410
1932	2,558	346	322		98				1,774		84	430	5,612
1933	928	46	778						2,439	112	34		4,337
1934	1,172	70	866		64				3,092	8	14	312	5,593
1935	608	32	566		80				2,196	2	4	611	4,099
1936	656	30	168		382				3,736		6	14	4,992
1937	716		56		330				2,640			778	4,520
1938	356				356				3,182				3,894
1939	616	4			210				3,362			381	4,573
1940	96				10				4,364			110	4,580
1941	2								1,876			14	1,892
1942									124				124
1943												12	12
1944												12	12
1945												478	478
1946		278	574						42			24	918
1947	11	201	85			8		1	2			1	309

(Continued on next page.)

APPENDIX TABLE 4--continued.

Crop year[b]	Country of origin												Total
	France	Italy	Turkey	Yugo-slavia	Ruma-nia	Iran	Syria	India	China	Canada	Spain	Other	
	thousand pounds												
1948	46	923	1,110			501	20	9	51	9		26	2,695
1949	388	416	637		28	309	1		4,439	e/		26	6,244
1950	1,296	1,584	1,963	26	233	255		29	1,113			228	6,727
1951	1,550	1,750	1,701		191	362		738				352	6,644
1952	4,444	1,619	220		40	225		57				384	6,989
1953	4,206	835	1,166			699						309	7,215
1954	2,933	422	1,158	54	44	2,117		1,125				273	8,126
1955	4,770	3,047	734	235	22	1,386		1,545				105	11,844
1956	1,815	864	228		37	839		25				275	4,083
1957	44	151	119		420	1,414		766				319	3,233
1958	681	432	988		176	326		467				231	3,301
1959	183	526	2,092	167	138	1,133		947				198	5,384
1960	589	800	2,614		127	364		2,137				295	6,926
1961	271	107	1,234		242	330		1,240				298	3,722
1962	510	377	1,651		240	696		561				18	4,053

a/ General imports unadjusted for reexports in period 1920-1941; thereafter, imports for consumption.

b/ Beginning August 1 except years 1941-1946, for which data are reported for year beginning September 1.

c/ Dashes indicate country of origin not available.

d/ Blanks indicate that imports, if any, not reported separately but assumed to be included in "other."

e/ Less than 500 pounds.

Sources:

1920-1946: California Federal-State Market News Service, Foreign Walnut Report (Sacramento, periodic weekly and monthly issues).

1947-1962: U. S. Bureau of the Census, United States Imports of Merchandise for Consumption: Commodity by Country of Origin, Report FT 110, monthly issues.

APPENDIX TABLE 5

France: Supply and Disposition of Walnuts, 1951-1962

Crop year[a]	Beginning stocks	Commercial production	Imports	Total supply	Exports	Domestic consumption
	short tons, in-shell basis					
1951	[b]				10,500	
1952					29,400	
1953	1,000	26,700			22,476[c]	
1954	100	26,500			16,531[d]	
1955	100	33,500			23,598	
1956	100	20,500		20,600	9,400	10,800
1957	400	9,500	700	10,600	4,300	6,200
1958		29,000	100	29,100	17,600	11,400
1959	100	18,600	600	19,300	9,500	9,800
1960		28,000		28,000	18,500	9,500
1961		20,400	200	20,600	12,100	8,500
1962[e]		31,000		31,000	21,500	9,500

a/ Beginning October 1.

b/ Blanks indicate no data available.

c/ Year beginning September 1.

d/ Year beginning July 1.

e/ Preliminary.

Source: California Federal-State Market News Service, Foreign Fruit and Nut Report (Sacramento, weekly issues).

APPENDIX TABLE 6

Italy: Supply and Disposition of Walnuts, 1951-1962

Crop year[a]	Beginning stocks	Commercial production	Imports	Total supply	Exports	Domestic consumption
	short tons, in-shell basis					
1951	500	19,800	[b]		16,400	
1952	100	27,800				
1953		7,700				
1954	900	12,500			8,850	
1955	900	29,000			19,400	
1956	500	39,000			22,000	
1957		13,000				
1958		25,000			14,900	
1959		22,000			15,300	
1960		26,500		26,500	20,500	5,500
1961	500	20,000	400	20,900	16,300	4,100
1962[c]	500	36,000		36,500	25,000	

a/ Beginning September 1.

b/ Blanks indicate no data available.

c/ Preliminary.

Source: California Federal-State Market News Service, Foreign Fruit and Nut Report (Sacramento, weekly issues).

APPENDIX TABLE 7

Commercial Production and Exports of Walnuts
Specified Countries, 1951-1962

Crop year	Commercial production				Exports			
	Yugo-slavia	Turkey	India	Iran	Yugo-slavia	Turkey	India	Iran
	short tons, in-shell basis							
1951	3,500	9,500	a/		1,300	3,500		
1952	3,600	4,000		5,800	1,500	4,000		
1953	3,500	6,900	7,000	7,400				
1954	5,800	5,500	11,000	7,100			10,109	
1955	6,100	6,100	8,000	6,800			6,851	
1956	2,700	4,200	9,500	4,400	900		8,668	5,500
1957	3,000	3,500	14,000	7,400	1,500		11,228	
1958	4,700	6,000	11,500	8,800	2,200	2,800	10,900	5,800
1959	3,200	7,300	9,000	8,500	1,100	3,400	7,700	5,500
1960	2,200	9,200	15,500	4,500	400	5,100	14,700	1,000
1961	4,300	10,800	10,500	4,200	600	5,700	9,900	1,000
1962 b/	5,000	8,500	12,000	3,600	1,500	5,000	10,000	600

a/ Blanks indicate no data available.

b/ Preliminary.

Source: California Federal-State Market News Service, Foreign Fruit and Nut Report (Sacramento, weekly issues).

APPENDIX TABLE 8

Walnuts: California Acreage and Yield and California, Oregon, and the United States Production, Grower Returns, and Value of Production, 1920-1963

Year	California acreage and yield: Bearing acreage	Non-bearing acreage	Yield per bearing acre	Production of value: California	Oregon	United States	Grower returns[a/]: California	Oregon	United States	Value of production: California	Oregon	United States
	1	2	3	4	5	6	7	8	9	10	11	12
	acres		tons, in-shell basis	tons, in-shell basis			dollars per ton, in-shell basis			thousand dollars		
1920	72,813	35,239	0.31	22,700	250	22,950	400	425	400	9,080	106	9,186
1921	75,411	37,476	0.30	23,000	350	23,350	400	425	400	9,200	149	9,349
1922	78,341	40,413	0.37	29,000	400	29,400	360	390	360	10,440	156	10,596
1923	80,779	44,600	0.33	26,500	450	26,950	400	425	400	10,600	191	10,791
1924	82,120	48,831	0.29	24,200	450	24,650	460	480	460	11,132	216	11,348
1925	83,654	52,609	0.43	36,000	550	36,550	440	480	441	15,840	264	16,104
1926	86,091	54,946	0.18	15,300	900	16,200	480	500	481	7,344	450	7,794
1927	88,987	55,039	0.57	51,000	1,100	52,100	330	360	331	16,830	396	17,226
1928	92,629	54,027	0.28	25,900	1,500	27,400	420	440	421	10,878	660	11,538
1929	97,588	52,105	0.43	42,000	1,400	43,400	320	360	321	13,440	504	13,944
1930	102,888	47,919	0.29	29,400	900	30,300	410	400	410	12,054	360	12,414
1931	107,687	45,724	0.29	31,600	2,600	34,200	219	275	223	6,920	715	7,635
1932	110,326	40,894	0.42	45,900	3,200	49,100	175	240	179	8,032	768	8,800
1933	113,914	37,702	0.29	32,700	1,300	34,000	222	280	224	7,259	364	7,623
1934	117,474	34,652	0.37	44,000	3,100	47,100	187	250	191	8,228	775	9,003
1935	121,109	32,160	0.44	53,300	4,100	57,400	201	230	203	10,713	943	11,656
1936	123,929	29,932	0.36	44,200	1,600	45,800	216	255	217	9,547	408	9,955
1937	125,909	26,572	0.47	59,800	2,600	62,400	180	200	181	10,764	520	11,284
1938	129,434	23,873	0.38	49,000	6,300	55,300	222	215	221	10,878	1,354	12,232
1939	129,876	22,712	0.44	57,400	5,100	62,500	168	170	168	9,643	867	10,510
1940	126,224	22,744	0.37	46,400	4,400	50,800	233	200	230	10,811	880	11,691

(Continued on next page.)

APPENDIX TABLE 8--continued.

Year	California acreage and yield: Bearing acreage	Non-bearing acreage	Yield per bearing acre	Production of value: California	Oregon	United States	Grower returns[a]: California	Oregon	United States	Value of production: California	Oregon	United States
	1	2	3	4	5	6	7	8	9	10	11	12
	acres		tons, in-shell basis	tons, in-shell basis			dollars per ton, in-shell basis			thousand dollars		
1941	124,303	22,364	0.51	63,000	7,000	70,000	253	240	252	15,939	1,680	17,619
1942	124,458	22,093	0.46	52,600[b]	3,150[c]	55,750	308	286	307	16,971	901	17,872
1943	125,768	21,162	0.47	58,500	5,100[c]	63,600	483	420	478	28,256	2,142	30,398
1944	125,679	21,561	0.52	65,000	6,500[c]	71,500	446	450	446	28,990	2,925	31,915
1945	126,941	22,464	0.50	64,000	6,700[c]	70,700	514	460	509	32,896	3,082	35,978
1946	126,039	25,356	0.50	63,000	8,900	71,900	570	440	555	35,910	3,916	39,826
1947	126,299	27,509	0.47	59,000	5,500[c]	64,500	388	310	382	22,892	1,705	24,597
1948	121,451	29,018	0.51	62,000	8,650[c]	70,650	442	240	419	27,404	2,076	29,480
1949	115,772	29,575	0.69	80,200	7,300[c]	87,500	363	220	351	29,113	1,672	30,785
1950	115,527	30,051	0.50	58,000	6,100[c]	64,100	392	320	385	22,736	1,984	24,720
1951	114,212	28,687	0.60	68,300	9,100	77,400	440	340	429	30,052	3,094	33,146
1952	114,228	27,421	0.66	75,600	8,200	83,800	400	360	396	30,240	2,952	33,192
1953	114,972	24,958	0.48	54,800	4,400	59,200	415	370	412	22,742	1,628	24,370
1954	113,263	22,823	0.59	67,000	8,100	75,100	360	260	350	24,120	2,106	26,226
1955	114,215	24,235	0.63	72,000	5,100	77,100	555	470	550	39,960	2,397	42,357
1956	113,922	27,523	0.61	69,000	2,800	71,800	442	390	440	30,498	1,092	31,590
1957	118,746	30,911	0.52	61,300	5,300	66,600	427	400	425	26,175	2,120	28,295
1958	120,721	32,804	0.68	82,200	6,500	88,700	377	380	377	30,989	2,470	33,459
1959	121,796	36,954	0.48	58,500	4,200	62,700	483	450	481	28,256	1,890	30,146
1960	123,525	36,512	0.57	70,300	2,500	72,800	535	570	536	37,610	1,425	39,035
1961	122,775	41,373	0.50	61,200	6,300	67,500	473	410	467	28,948	2,583	31,531
1962	123,335	39,215	0.62	77,000	2,900	79,900	469	420	467	36,113	1,218	37,331
1963	126,200[d]											

(Continued on next page.)

APPENDIX TABLE 8--continued.

a/ Equivalent in-shell returns at growers' first delivery points.

b/ Excludes 2,500 tons not harvested.

c/ Excludes the following quantities (in tons) not harvested: 1942, 450; 1943, 200; 1944, 300; 1945, 200; 1947, 100; 1948, 450; 1949, 300; and 1950, 100.

d/ Preliminary.

Sources:

Cols. 1-3: California Crop and Livestock Reporting Service, California Fruit and Nut Crops, 1909-1955: Acreage, Production, Utilization, and Value, Special Publication 261 (Sacramento, 1956), pp. 102-103.

Idem, California Fruit and Nut Crops: Acreage, Production, Utilization and Value, 1949-1961 (Sacramento, 1962), p. 43.

Idem, California Fruits: 1963 Annual Summary (Sacramento, 1963), p. 3.

Cols. 4-12: U. S. Bureau of Agricultural Economics, Tree Nuts: Acreage, Production, Farm Disposition, Value, and Utilization of Sales, 1909-45, 1947, pp. 2-4 and 6-7.

Idem, Tree Nuts: Production, Farm Disposition, Value, and Utilization of Sales, 1944-51, 1952, pp. 2-3.

U. S. Agricultural Marketing Service, Tree Nuts, by States, 1949-55, Statistical Bulletin No. 195, 1956, p. 3.

U. S. Statistical Reporting Service, Tree Nuts, by States, 1954-59, Statistical Bulletin No. 295, 1961, p. 5.

Idem, Tree Nuts, by States, 1960 and 1961, 1962, p. 4.

Idem, Tree Nuts, by States, 1961 and 1962, 1963, p. 4.

APPENDIX TABLE 9

Walnuts: Utilization of Sales and Production of Shelled Meats, United States, 1939-1962

Crop year[a]	Total sales[b]	Merchantable unshelled grades		Culls and blows		Orchard run direct to shellers[c]	To oil mills	Local sales	Total shelled	Shelled meats produced	Total shelled as percent of total sales
		Sold in-shell	Shelled	Shelled	Not used						
	tons, in-shell basis									million pounds	
1939	61,720	31,190	13,560	11,100	0	5,590	0	280	30,250	20,026	49.0
1940	50,020	30,640	6,710	6,800	0	5,590	0	280	19,100	13,719	38.2
1941	69,210	33,580	17,020	10,610	40	7,660	0	300	35,290	26,857	51.0
1942	57,485	39,520	3,960	8,785	105	4,835	0	280	17,580	11,814	30.2
1943	62,800	41,170	3,330	9,700	25	8,275	0	300	21,305	14,270	33.9
1944	70,630	43,400	2,410	13,520	20	10,730	250	300	26,660	17,070	37.7
1945	69,900	48,180	3,380	8,075	60	9,905	0	300	21,360	15,695	30.6
1946	71,150	46,880	3,820	9,200	200	10,650	0	400	23,670	16,892	33.3
1947	63,650	37,020	9,005	10,050	325	6,950	0	300	26,005	18,958	40.9
1948	69,800	44,330	4,570	11,400	100	9,000	0	400	24,970	16,138	35.8
1949	87,050	45,480	15,030	2,220	100	10,050	13,770	400	27,300	20,983	31.4
1950	63,450	38,080	5,320	8,250	50	11,400	0	350	24,970	18,104	39.4
1951	76,600	47,700	8,900	9,100	100	10,400	0	400	28,400	20,648	37.1
1952	82,900	40,940	17,730	6,700	75	11,350	5,730	375	35,780	26,114	43.2
1953	58,450	33,440	8,110	7,090	50	9,460	0	300	24,660	17,400	42.2
1954	74,250	40,870	9,430	7,920	10	15,100	570	350	32,450	22,112	43.7
1955	76,300	36,260[d]	15,940	9,320	10	13,710	800	260	38,970	29,885	51.1
1956	71,100	37,510[d]	12,210	8,690	0	11,530	810	350	32,430	24,591	45.6
1957	65,800	28,290	20,100	6,460	50	9,000[e]	1,550	350	35,410	27,174	53.8
1958	87,900	33,850	18,990	10,600	50	22,390	1,320	700	51,980	38,377	59.1
1959	62,000	30,450	150	2,240	10	26,750	2,000	400	29,140	22,670	47.0
1960	72,220	27,800	80	180	6	590	14	250	44,150[f]	32,810[g]	61.1
1961	66,800	27,800	40	130	30	2,200	0	400	38,570[f]	28,627[g]	57.7
1962	79,300	28,900	[h]					220	50,180	37,202	63.3

(Continued on next page.)

APPENDIX TABLE 9--continued.

a/ Data not available prior to 1939.

b/ Total sales equals production in Oregon and California less home use by producer and includes the following quantities (in tons) of Washington walnuts shipped into Oregon which are not included in Appendix Table 8.

1939--60	1944-- 30	1948--100
1940--50	1945--100	1949--150
1941--70	1946--150	1950-- 50
1942-- 5	1947-- 50	1951--100
1943--50		

c/ In Oregon, includes some quantities shelled on the farm and sold.

d/ Includes some quantities shelled.

e/ Includes some quantities disposed of in-shell.

f/ Total does not equal sum of sources for shelling because data not separated for California.

g/ Includes only merchantable kernels for California.

h/ Blanks indicate separate estimates not available; included in "total shelled."

Sources:

U. S. Agricultural Marketing Service, Tree Nuts, by States, 1949-55, Statistical Bulletin No. 195, 1956, p. 4.

U. S. Statistical Reporting Service, Tree Nuts, by States, 1954-59, Statistical Bulletin No. 295, 1961, p. 6.

California Crop and Livestock Reporting Service, Tree Nut Production (Sacramento, August 9, 1963), p. 2.

APPENDIX TABLE 10

Walnuts: Pacific Coast Merchantable In-Shell and Shelled Supply and Trade Acquisition, 1924-1963

Crop year[a]	In-shell						Shelled-kernel weight			
	Production	Handler carry-in	Total supply	Diverted under regulation	Available for in-shell sale	Trade acquisition	Production	Handler carry-in	Total supply	Trade acquisition
	1	2	3	4	5	6	7	8	9	10
	thousand pounds									
1924	43,491	0	43,491	0	43,491	43,491	1,357	0	1,357	[b]
1925	58,599	0	58,599	0	58,599	58,099	4,122	0	4,122	
1926	24,841	500	25,341	41[c]	25,300	25,300	1,868	0	1,868	
1927	85,201	0	85,201	648[c]	84,553	77,953	5,066	0	5,066	
1928	44,332	6,600	50,932	351[c]	50,581	48,831	2,798	0	2,798	
1929	67,490	1,750	69,240	1,537[c]	67,703	60,503	3,965	0	3,965	
1930	50,359	7,200	57,559	72[c]	57,487	53,787	2,333	0	2,333	
1931	40,801	3,700	44,501	0	44,501	44,501	6,458	0	6,458	
1932	78,740	0	78,740	530[c]	78,210	57,491	4,967	0	4,967	
1933	51,082	20,719	71,801	21,545	50,256	44,955	6,800	2,000[c]	8,800	6,352
1934	71,932	5,301	77,233	22,417	54,816	54,812	9,700	2,448[c]	12,148	8,656
1935	90,381	4	90,385	25,372	65,013	55,747	9,500	3,492[c]	12,992	9,572
1936	67,734	9,266	77,000	20,400[d]	56,600	55,336	11,000	3,420[c]	14,420	10,460
1937	92,600	1,264	93,864	32,100[d]	61,764	60,164	15,800	3,960[c]	19,760	14,072
1938	87,600	1,600	89,200	23,500[d]	65,700	58,600	12,400	5,688[c]	18,038	14,065
1939	89,100	7,100	96,200	31,100	65,100	60,900	20,000	3,973	23,973	15,871
1940	73,900	4,200	78,100	16,200[d]	61,900	59,500	13,700	8,102	21,802	17,698
1941	101,000	2,400	103,400	35,200[d]	68,200	63,000	26,900	4,104	31,004	21,889
1942	87,000	5,200	92,200	8,100[d]	84,100	80,500	11,800	9,115	20,915	20,694
1943	90,800	3,600	94,400	9,100[d]	85,300	83,100	14,300	221	14,521	14,207
1944	95,300	2,200	97,500	11,500[d]	86,000	84,400	17,100	314	17,414	15,578
1945	106,200	1,600	107,800	15,000[d]	92,800	89,800	15,700	1,836	17,536	17,137
1946	103,200	3,000	106,200	14,000[d]	92,200	86,566	16,900	399	17,299	14,407
1947	92,291	5,634	97,925	20,794[d]	77,131	74,520	18,958	2,892	21,850	17,383
1948	97,131	2,611	99,742	10,038[d]	89,704	82,410	16,137	2,727	18,865	15,873
1949	125,954	7,294	133,248	36,070[d]	97,178	79,784	20,954	2,992	23,946	17,686

(Continued on next page.)

APPENDIX TABLE 10--continued.

Crop year[a]	In-shell						Shelled-kernel weight			
	Production	Handler carry-in	Total supply	Diverted under regulation	Available for in-shell sale	Trade acquisition	Production	Handler carry-in	Total supply	Trade acquisition
	1	2	3	4	5	6	7	8	9	10
	thousand pounds									
1950	86,290	17,394	103,684	11,543[d]	92,141	84,300	18,104	6,260	24,364	22,418
1951	112,979	7,841	120,820	19,403[d]	101,417	88,490	20,648	1,946	22,594	19,797
1952	122,115	12,927	135,042	43,630[d]	91,412	77,090	26,114	2,797	28,911	21,164
1953	83,302	14,322	97,624	19,788	77,836	67,180	17,400	7,747	25,147	20,983
1954	99,568	10,656	110,224	27,866	82,358	75,030	23,289	4,164	27,453	25,724
1955	104,402	7,328	111,730	28,557[d]	83,173	71,479	28,999	1,729	30,728	22,282
1956	99,440	11,694	111,134	23,440[d]	87,649	68,125	23,057	8,446	31,503	24,884
1957	96,300	19,524	115,824	43,825	71,999	53,914	26,981	8,109	35,090	26,822
1958	95,711	18,085	113,856	41,306	72,550	57,338	38,036	6,778	44,814	32,712
1959	58,600	15,212	73,812		73,812	63,812	23,598	12,102	35,700	33,832
1960	60,076	10,000	70,076	0	70,076	61,299	32,865	1,868	34,733	28,745
1961	55,968	8,777	64,745	0	64,745	57,138	28,590	5,988	34,578	29,102
1962	60,410	7,607	68,017	1,835	66,182	53,708	37,784	5,476	43,260	35,865
1963		12,474						7,252		

a/ Beginning August 1.

b/ Blanks indicate no data available.

c/ Voluntarily shelled by packer.

d/ Includes in-shell walnuts exported by packers, voluntarily diverted to shelling, oil, or other miscellaneous uses as follows (expressed in thousand pounds).

1936--4,100	1943-- 400	1949-- 6,300
1937-- 100	1944--2,700	1950-- 1,800
1938--6,100	1945--5,200	1951-- 2,100
1940--5,100	1946--4,800	1952--18,700
1941-- 100	1947--2,600	1955--28,557
1942-- 600	1948-- 300	1956--23,440

e/ Estimated on basis of carry-in in 1938-1940 as a percentage of preceding year's production.

(Continued on next page.)

APPENDIX TABLE 10--continued.

Sources:

Cols. 1-6:

1924-1936: U. S. Agricultural Adjustment Administration, 1938 (unpublished data).

1937-1963: Walnut Control Board records, San Mateo, California.

Cols. 7-10:

1924-1933: California Walnut Growers Association, Exhibits Presented by J. J. McFadden at the Hearing of the Agricultural Adjustment Administration, September 23, 1935 (Los Angeles, 1935), unpaged.

1934-1963: Walnut Control Board records, San Mateo, California.

APPENDIX TABLE 11

Walnuts: Buyer Acquisitions for Consumption from Domestic Production and Imports for Consumption, United States, 1924-1962

Crop year[a]	In-shell			Shelled		
	From domestic production	From imports[b]	Total	From domestic production[c]	From imports[b]	Total
	1	2	3	4	5	6
	thousand pounds					
1924	43,491	24,723	68,214	1,357	23,365	24,722
1925	58,099	24,990	83,089	4,122	23,136	27,258
1926	25,300	26,000	51,300	1,868	20,879	22,747
1927	77,953	11,263	89,216	5,066	15,871	20,937
1928	48,831	14,727	63,558	2,798	17,936	20,734
1929	60,503	7,957	68,460	3,965	16,850	20,815
1930	53,787	3,270	57,057	2,333	16,326	18,659
1931	44,501	4,907	49,408	6,458	10,956	17,414
1932	57,491	2,096	59,587	4,967	5,560	10,527
1933	44,955	318	45,273	6,352	5,548	11,900
1934	54,812	30	54,842	8,656	5,408	14,064
1935	55,747	315	56,062	9,572	3,650	13,222
1936	55,336	73	55,409	10,460	5,412	15,872
1937	60,164	253	60,417	14,072	4,016	18,088
1938	58,600	136	58,736	14,065	4,404	18,469
1939	60,900	38	60,938	15,871	4,346	20,217
1940	59,500	0	59,500	17,698	4,640	22,338
1941	63,000	0	63,000	21,889	1,892	23,781
1942	80,500	0	80,500	20,694	124	20,818
1943	83,100	0	83,100	14,207	12	14,219
1944	84,400	0	84,400	15,578	12	15,590
1945	89,800	48	89,800	17,137	478	17,615
1946	86,566	236	86,566	14,407	918	15,325
1947	74,520	7	74,527	17,383	309	17,692
1948	82,410	67	82,477	15,873	2,695	18,563
1949	79,784	6	79,790	17,686	6,244	23,930
1950	84,300	108	84,408	22,418	6,727	29,145
1951	88,490	15	88,505	19,797	6,644	26,441
1952	77,090	106	77,196	21,164	6,989	28,153
1953	67,180	0	67,180	20,983	7,215	28,198
1954	75,030	0	75,030	25,724	8,126	33,850
1955	71,479	554	72,033	22,282	11,844	34,126
1956	68,125	100	68,225	24,884	4,083	28,967
1957	53,914	49	53,963	26,822	3,233	30,055
1958	57,338	57	57,395	32,712	3,301	36,013
1959	63,812	102	63,914	33,832	5,384	39,216
1960	61,299	72	61,371	28,745	6,926	35,707
1961	57,138	45	57,183	29,102	3,722	32,824
1962	53,708	6	53,714	35,865	4,053	39,918

(Continued on next page.)

APPENDIX TABLE 11--continued.

a/ Beginning August 1 for domestic production data. Year beginning September 1 for import data in period 1924-1946; thereafter, import data reported for year beginning August 1.

b/ General imports less reexports in period 1924-1941; thereafter, imports for consumption. Data for most years during 1924-1940 do not correspond with those reported in Appendix Tables 3 and 4 because of adjustments for re-exports.

c/ Acquisitions for years 1924-1932 assumed to equal production in those years.

Sources:

Cols. 1 and 4: Appendix Table 10.

Cols. 2 and 5: California Federal-State Market News Service, Foreign Walnut Report (Sacramento, periodic weekly and monthly issues).

California Walnut Growers Association, Exhibits Presented by J. J. McFadden at the Hearing of the Agricultural Adjustment Administration, September 23, 1935 (Los Angeles, 1935), unpaged.

U. S. Bureau of the Census (prior to May, 1941, U. S. Bureau of Foreign and Domestic Commerce), Monthly Summary of Foreign Commerce of the United States, monthly issues.

U. S. Bureau of the Census, United States Imports of Merchandise for Consumption: Commodity by Country of Origin, Report FT 110, monthly issues.

APPENDIX TABLE 12

Walnuts: Per Capita Acquisitions for Consumption from Domestic Production and Imports for Consumption, United States, 1924-1962

Year[a]	In-shell			Shelled		
	From domestic production	From imports	Total	From domestic production	From imports	Total
	pounds per capita					
1924	.381	.217	.598	.012	.205	.217
1925	.502	.216	.718	.036	.200	.236
1926	.216	.222	.438	.016	.178	.194
1927	.655	.095	.750	.043	.133	.176
1928	.405	.122	.527	.023	.149	.172
1929	.497	.065	.562	.033	.138	.171
1930	.437	.027	.464	.019	.133	.152
1931	.359	.040	.399	.052	.088	.141
1932	.461	.017	.478	.040	.045	.085
1933	.358	.003	.361	.051	.044	.095
1934	.434	b/	.434	.069	.043	.112
1935	.438	.003	.441	.075	.029	.104
1936	.432	.001	.433	.082	.042	.124
1937	.467	.002	.469	.109	.031	.140
1938	.451	.001	.452	.108	.034	.142
1939	.465		.465	.121	.033	.154
1940	.449		.449	.134	.035	.169
1941	.471		.471	.164	.014	.178
1942	.598		.598	.154	.001	.155
1943	.615		.615	.105		.105
1944	.630		.630	.116		.116
1945	.673		.673	.128	.004	.132
1946	.615	.002	.617	.102	.007	.109
1947	.517		.517	.121	.002	.123
1948	.562	.001	.563	.108	.018	.126
1949	.534		.534	.119	.042	.161
1950	.555	.001	.556	.148	.044	.192
1951	.575		.575	.129	.043	.172
1952	.493	.001	.494	.135	.045	.180
1953	.423		.423	.132	.045	.177
1954	.464		.464	.159	.050	.209
1955	.433	.003	.436	.135	.072	.207
1956	.405	.001	.406	.148	.024	.172
1957	.315		.315	.157	.019	.176
1958	.329		.329	.188	.019	.207
1959	.360	.001	.361	.191	.030	.221
1960	.341		.341	.160	.039	.199
1961	.312		.312	.160	.020	.180
1962	.289		.289	.193	.022	.215

a/ Beginning August 1.

b/ Blanks indicate less than .0005 pounds per capita.

Sources: Acquisitions from domestic production and imports (Appendix Table 11) divided by United States total resident population on July 1 of year indicated (Appendix Table 21).

APPENDIX TABLE 13

Walnut Prices, 1925-1961

Year[a]	F.O.B. Pacific Coast[b]		Received by growers	Average value of shelled imports	Ratio, column 2 to column 4
	In-shell	Shelled			
	1	2	3	4	5
	cents per pound				
1925	23.4	56.0	22.0	29.1	1.924
1926	27.5	54.7	24.0	23.7	2.308
1927	19.6	45.0	16.6	32.9	1.368
1928	24.3	45.5	21.0	26.7	1.704
1929	19.7	44.5	16.0	29.0	1.534
1930	21.9	45.5	20.5	22.3	2.040
1931	16.0	44.8	11.2	16.8	2.667
1932	13.1	33.4	9.0	14.0	2.386
1933	15.7	35.2	11.2	16.2	2.173
1934	14.9	33.5	9.6	16.0	2.094
1935	14.4	33.8	10.2	15.3	2.209
1936	15.4	34.0	10.8	15.3	2.222
1937	13.4	34.2	9.1	15.2	2.250
1938	15.8	35.4	11.0	13.9	2.547
1939	12.6	34.6	8.4	12.4	2.790
1940	15.8	35.1	11.5	10.9	3.220
1941	18.0	40.0	12.6	[c]	
1942	19.5	41.2	15.4		
1943	29.2	76.3	23.9		
1944	29.2	76.3	22.3		
1945	30.3	76.3	25.4		
1946	36.6	83.3	27.8		
1947	26.8	66.4	19.1	52.0	1.277
1948	29.9	71.1	21.0	47.7	1.490
1949	27.0	65.7	17.6	32.1	2.047
1950	26.5	70.8	19.2	40.7	1.739
1951	29.8	65.4	21.4	41.7	1.568
1952	30.6	69.0	19.8	41.4	1.667
1953	31.4	76.2	20.6	42.6	1.789
1954	27.5	67.3	17.5	43.4	1.551
1955	37.3	99.3	27.5	56.3	1.764
1956	37.3	66.2	22.0	56.2	1.178
1957	37.0	78.1	21.2	43.3	1.804
1958	32.3	69.7	18.8	44.1	1.580
1959	33.5	79.0	24.0	47.6	1.660
1960	36.3	86.2	26.8	48.7	1.770
1961	34.3	78.8	23.4	47.7	1.652

(Continued on next page.)

APPENDIX TABLE 13--continued.

a/ Beginning August 1.

b/ Average annual prices by grade and pack weighted by distribution of sales by pack and grade.

c/ Blanks indicate no data available.

Sources:

Cols. 1 and 2:

1925-1936: U. S. Agricultural Adjustment Administration, 1938 (unpublished data).

1937-1961: Walnut Control Board records, San Mateo, California.

Col. 3: Appendix Table 8.

Col. 4: Total imports for consumption divided by total value of imports for consumption.

California Federal-State Market News Service, Foreign Walnut Report (Sacramento, periodic weekly and monthly issues).

U. S. Bureau of the Census, United States Imports of Merchandise for Consumption: Commodity by Country of Origin, Report FT 110, monthly issues.

APPENDIX TABLE 14

United States Imports of Almonds, Filberts, Pecans, and Brazil Nuts, 1920-1961

Year[a]	Almonds			Filberts			Pecans			Brazils		
	Shelled	In-shell	Total, shelled equivalent[b]	Shelled	In-shell	Total, shelled equivalent[b]	Shelled	In-shell	Total, shelled equivalent[b]	Shelled	In-shell[c]	Total, shelled equivalent[b]
	1	2	3	4	5	6	7	8	9	10	11	12
	thousand pounds											
1920	13,875	6,622	16,082	2,169	11,791	6,885	d/	2,220	866		37,098	18,549
1921	26,619	4,723	28,193	5,434	14,133	11,087		1,032	402		38,870	19,435
1922	22,972	4,578	24,498	6,209	14,366	11,955		3,030	1,182		39,806	19,803
1923	23,412	2,654	24,297	7,353	14,111	12,997		655	255		45,241	22,621
1924	21,362	3,802	22,629	4,345	9,326	8,075		2,941	1,147		32,701	16,351
1925	18,575	3,703	19,810	6,669	11,105	11,111		868	339		30,017	15,009
1926	15,699	638	15,885	4,950	9,822	8,879		1,057	412		42,867	21,434
1927	18,257	464	18,411	6,600	11,244	11,138		152	59		13,439	6,720
1928	18,111	1,891	18,741	5,639	12,102	10,480		849	331		37,922	18,948
1929	18,304	5,504	20,139	4,503	5,756	6,805		124	48	4,090	19,079	13,630
1930	13,241	78	13,267	4,596	5,659	6,860		506	197	3,174	22,730	14,539
1931	8,336	9	8,339	2,350	6,377	4,901		60	23	7,518	16,486	15,761
1932	4,863	144	4,911	3,306	5,800	5,626		2	1	5,296	17,462	14,027
1933	3,410	6	3,412	2,026	2,551	3,046		492	192	7,020	16,793	15,417
1934	2,986	4	2,987	2,094	2,438	1,185		377	147	7,993	16,920	16,453
1935	9,937	2,731	10,846	2,040	3,457	3,423		266	104	10,149	23,385	21,842
1936	11,270	571	11,460	2,425	4,213	4,110		160	62	8,736	19,690	18,581
1937	3,073	2	3,074	1,960	206	2,042		64	25	6,521	12,697	12,870
1938	1,506	2	1,507	1,796	455	1,978		202	79	8,933	20,585	19,226
1939	1,374	2	1,375	2,486	1,514	3,092		274	107	9,810	22,852	21,236
1940	1,986	e/	1,986	1,475	69	1,503		23	9	16,179	26,653	29,506

(Continued on next page.)

APPENDIX TABLE 14--continued.

Year[a]	Almonds			Filberts			Pecans			Brazils		
	Shelled	In-shell	Total, shelled equivalent[b]	Shelled	In-shell	Total, shelled equivalent[b]	Shelled	In-shell	Total, shelled equivalent[b]	Shelled	In-shell[c]	Total, shelled equivalent[b]
	1	2	3	4	5	6	7	8	9	10	11	12
	thousand pounds											
1941	3,721	8	3,724	83		83		e/	e/	10,667	17,627	19,481
1942	1,012		1,012	59		59	3	13	8	4,384	9,119	8,944
1943	11,063	878	11,355	1,051	11	1,055		359	140	1		1
1944	22,403	308	22,506	7,262	22	7,271		358	140		e/	
1945	18,116	501	18,283	9,588	89	9,624		212	83	6,203	4,282	8,344
1946	8,928	404	9,063	10,487	3,621	11,935	357	158	419	6,902	23,951	18,878
1947	11,840	19	11,846	4,202	14	4,208	401	170	467	6,160	26,966	19,643
1948	10,304	6	10,306	7,772	27	7,783	38		38	5,742	26,064	18,774
1949	1,509	1	1,509	6,463	93	6,500	352	1	352	8,013	22,868	19,447
1950	12,440	282	12,534	4,942	23	4,951	643	19	650	6,180	10,384	11,372
1951	3,636	e/	3,636	6,978	184	7,052	375		375	6,382	21,056	16,910
1952	6,763		6,763	5,207	165	5,273	217		217	5,672	19,490	15,417
1953	6,946		6,946	5,363	445	5,541	248		248	6,225	19,894	16,172
1954	1,324		1,324	6,947		6,947	421	33	434	5,334	15,172	12,920
1955	436	e/	436	6,035		6,035	464	738	752	9,098	23,058	20,627
1956	67	e/	67	5,407	932	5,780	247	132	298	8,482	20,085	18,525
1957	4,814		4,814	5,134	186	5,208	379	48	398	10,649	17,889	19,594
1958	11,840	747	12,089	6,857	138	6,912	382	122	430	9,399	19,805	19,302
1959	1,494	162	1,548	6,685	37	6,700	536	921	895	7,888	17,150	16,463
1960	600	262	687	5,368	44	5,386	467	442	639	9,661	20,246	19,784
1961	354	109	390	2,596	46	2,614	66		66	12,820	15,885	20,763

(Continued on next page.)

APPENDIX TABLE 14--continued.

a/ Beginning July 1.

b/ In-shell converted at shelling rate of 33.3 percent for almonds, 40.0 percent for filberts, 39.0 percent for pecans, and 50.0 percent for Brazils.

c/ Imports of shelled and in-shell Brazil nuts were not separately classified prior to 1929.

d/ Blanks indicate no imports reported.

e/ Less than 500 pounds.

Sources:

U. S. Bureau of the Census (prior to May, 1941, U. S. Bureau of Foreign and Domestic Commerce), Monthly Summary of Foreign Commerce of the United States, monthly issues.

U. S. Bureau of the Census, United States Imports of Merchandise for Consumption: Commodity by Country of Origin, Report FT 110, monthly issues.

U. S. Bureau of Agricultural Economics, Foreign Trade of the United States, Annual, 1790-1929: Nuts, Domestic Exports, Imports, Reexports and Net Balance, Quantity and Value, by Caroline G. Gries, Report F. S. 51, 1930, 35p.

Reports of the Almond Control Board, Sacramento, California; Filbert Control Board, Tigard, Oregon; and Walnut Control Board, San Mateo, California.

APPENDIX TABLE 15

United States Imports of Cashew, Pignolia, and Pistachio Nuts, 1922-1961

Year[a]	Cashews, shelled[b]	Pignolias			Pistachios		
		Shelled	In-shell	Total, shelled equivalent[c]	Shelled	In-shell	Total, shelled equivalent[c]
	1	2	3	4	5	6	7
	thousand pounds						
1922	[d]	387		387		1,145	573
1923		192		192		1,207	604
1924		691		691		842	421
1925		557		557		701	351
1926		674		674		1,218	609
1927		713		713		1,839	920
1928		610		610		1,266	633
1929		553		553		1,368	684
1930	7,437	400		400		1,137	569
1931	13,166	443		443		1,904	952
1932	7,151	325		325		2,407	1,204
1933	14,069	283		283		1,510	755
1934	17,945	347		347		2,209	1,105
1935	21,166	499		499		4,766	2,383
1936	25,721	388		388		3,207	1,604
1937	26,117	365		365		3,255	1,628
1938	29,350	357		357		2,336	1,168
1939	25,404	303		303		3,234	1,617
1940	33,395	181		181		4,317	2,159
1941	31,548	[e]		[e]		1,248	624
1942	8,898					66	33
1943	7,330	316		316		1,276	638
1944	18,845	262		262		1,260	630
1945	29,721	211		211		2,414	1,207
1946	30,684	315		315		6,796	3,398
1947	28,488	255	4	257	1,168	6,199	4,268
1948	38,238	212	8	217	227	4,448	2,451
1949	39,472	263	1	264	286	7,189	3,881
1950	54,858	317	8	322	424	7,611	4,230
1951	42,273	239	25	254	811	7,272	4,447
1952	45,050	282	25	297	311	5,866	3,244
1953	48,312	345	66	385	236	3,892	2,182
1954	66,746	398	9	403	273	7,365	3,956
1955	63,510	508	2	509	262	5,578	3,051
1956	49,228	332	1	333	358	8,633	4,675
1957	69,662	859	5	862	420	8,532	4,686
1958	62,371	438	6	442	895	9,849	5,820
1959	65,088	506	10	512	444	12,913	6,901
1960	63,537	482	2	483	364	8,510	4,619
1961	58,358	430	155	493	285	13,467	7,019

(Continued on next page.)

APPENDIX TABLE 15--continued.

a/ Beginning July 1.

b/ Imported in shelled form only.

c/ In-shell converted at shelling rate of 60 percent for pignolias and 50 percent for pistachios.

d/ Blanks indicate no imports reported.

e/ Less than 500 pounds.

Sources:

U. S. Bureau of the Census (prior to May, 1941, U. S. Bureau of Foreign and Domestic Commerce), Monthly Summary of Foreign Commerce of the United States, monthly issues.

U. S. Bureau of the Census, United States Imports of Merchandise for Consumption: Commodity by Country of Origin, Report FT 110, monthly issues.

U. S. Bureau of Agricultural Economics, Foreign Trade of the United States, Annual, 1790-1929: Nuts, Domestic Exports, Imports, Reexports and Net Balance, Quantity and Value, by Caroline G. Gries, Report F. S. 51, 1930, 35p.

Reports of the Almond Control Board, Sacramento, California; Filbert Control Board, Tigard, Oregon; and Walnut Control Board, San Mateo, California.

APPENDIX TABLE 16

Filberts: Production, Farm Sales, Utilization, and Total Available Supply
United States, 1927-1961

Year[a]	Production	Farm sales	Utilization of sales			Shelled meats produced	In-shell carry-in	Available supply		
			Total	In-shell	Shelled			In-shell	Shelled	Total, shelled equivalent
	1	2	3	4	5	6	7	8	9	10
	tons, in-shell basis					thousand pounds	tons	thousand pounds		
1927	60	50	b/							11,186
1928	200	180								10,640
1929	200	180								6,965
1930	300	280								7,100
1931	420	380								5,237
1932	490	450								6,018
1933	1,070	1,010								3,902
1934	1,210	1,150								2,153
1935	1,240	1,155								4,415
1936	2,100	2,000								5,790
1937	2,570	2,450								4,098
1938	2,440	2,300								3,930
1939	3,890	3,730	3,730	3,130	145	106		7,774	2,592	5,702
1940	3,210	3,050	3,050	2,490	135	99		5,049	1,574	3,594
1941	5,750	5,570	5,570	4,520	320	240		9,040	323	3,939
1942	4,270	3,980	3,980	2,875	575	415		5,750	474	2,774
1943	7,030	6,660	6,660	5,070	1,140	774		10,151	1,825	5,885
1944	6,520	6,200	6,200	4,990	690	513		10,002	7,775	11,776
1945	5,320	5,070	5,070	4,080	370	267		8,249	9,855	13,155
1946	8,450	8,170	8,170	6,190	1,190	932		16,001	11,419	17,819
1947	8,800	8,470	8,470	4,220	3,640	2,945		8,454	7,147	14,300

(Continued on next page.)

APPENDIX TABLE 16--continued.

Year[a]	Production	Farm sales	Utilization of sales			Shelled meats produced	In-shell carry-in	Available supply		
			Total	In-shell	Shelled			In-shell	Shelled	Total, shelled equivalent
	1	2	3	4	5	6	7	8	9	10
	tons, in-shell basis					thousand pounds	tons	thousand pounds		
1948	6,380	5,700	5,700	4,320	865	604		8,667	8,376	16,763
1949	10,800	10,240	10,240	5,550	3,990	3,045		11,193	9,508	13,985
1950	6,570	5,450	5,450	4,265	840	619	1,040	10,633	5,561	8,982
1951	6,740	6,105	6,105	5,135	600	426	305	11,064	7,404	11,586
1952	11,790	11,195	11,195	7,005	3,730	2,943	397	14,969	8,150	13,820
1953	4,900	4,510	4,510	3,470	535	358	1,329	10,043	5,721	8,675
1954	8,620	8,130	8,130	5,990	1,610	1,181	548	13,076	8,128	12,890
1955	7,710	7,385	7,385	5,621	1,356	907	1,015	13,272	6,942	11,439
1956	3,040	2,910	2,910	2,507	207	104	1,440	8,826	5,511	7,890
1957	12,510	11,980	11,980	7,558	3,888	3,010	145	15,592	8,144	14,264
1958	7,540	7,250	7,250	5,040	1,653	1,304	1,938	14,094	8,161	12,248
1959	10,100	9,845	9,845	5,830	3,545	2,794	998	13,693	9,479	14,158
1960	8,950	8,735	8,735	5,391	2,895	2,307	894	12,614	7,675	12,006
1961	11,760	11,515	11,515	5,466	5,498	4,322	810	12,598	6,918	11,309

(Continued on next page.)

APPENDIX TABLE 16--continued.

a/ Beginning July 1. Data not available prior to 1927.

b/ Blanks indicate no data available.

Sources:

Cols. 1-6: U. S. Bureau of Agricultural Economics, Tree Nuts: Acreage, Production, Farm Disposition, Value, and Utilization of Sales, 1909-45, 1947, pp. 9-10.

U. S. Agricultural Marketing Service, Tree Nuts, by States, 1949-55, Statistical Bulletin No. 195, 1956, pp. 5-6.

U. S. Statistical Reporting Service, Tree Nuts, by States, 1954-59, Statistical Bulletin No. 295, 1961, pp. 7-8.

Idem, Tree Nuts, by States, 1960 and 1961, 1962, p. 5.

Col. 7: Filbert Control Board, Tigard, Oregon (annual statistical reports).

Col. 8: Column 4 plus column 7 plus in-shell imports from Appendix Table 14.

Col. 9: Column 6 plus shelled imports from Appendix Table 14.

Col. 10:

1927-1938: Column 1 multiplied by 0.8 plus imports, shelled equivalent, from Appendix Table 14.

1939-1961: Column 9 plus column 4 multiplied by 0.8 plus imports, shelled equivalent, from Appendix Table 14.

Almonds: Production, Farm Sales, Utilization, and Total Available Supply, United States, 1920-1962

Year[a]	In-shell						Shelled				Total available supply, shelled equivalent
	Production	Farm sales	Carry-in	Production[b]	Total domestic supply	Total available supply	Carry-in	Production[b]	Total domestic supply	Total available supply	
	1	2	3	4	5	6	7	8	9	10	11
	tons, in-shell basis		tons, in-shell basis			thousand pounds	thousand pounds				thousand pounds
1920	6,000	5,700	c/								22,082
1921	6,200	5,900									34,393
1922	9,000	8,700									33,498
1923	11,000	10,800									35,297
1924	8,000	7,800									30,629
1925	7,500	7,300									27,310
1926	16,000	15,800									31,885
1927	12,000	11,800									30,411
1928	14,000	13,800									32,741
1929	4,700	4,500									24,839
1930	13,500	13,300									26,767
1931	14,800	14,600									23,139
1932	14,000	13,800									18,911
1933	12,900	12,700									16,312
1934	12,000	11,800									14,987
1935	12,700	12,500									23,546
1936	10,700	10,500									22,160
1937	24,600	24,400									27,674
1938	18,400	18,200									19,907
1939	28,700	28,500		8,323	8,323	16,648		20,377	20,377	21,751	30,075
1940	15,000	14,800		4,350	4,350	8,700		10,650	10,650	12,636	16,986
1941	9,500	9,300		2,755	2,755	5,518		6,745	6,745	10,466	13,224
1942	31,500	31,300		9,135	9,135	18,270		22,365	22,365	23,377	32,512
1943	20,500	20,300		4,100	4,100	9,078		16,400	16,400	27,463	31,855
1944	31,700	31,500		6,340	6,340	12,988		25,360	25,360	47,763	54,206
1945	32,000	31,800		6,400	6,400	13,301		25,600	25,600	43,716	50,283
1946	47,200	47,000		9,440	9,440	19,284		37,760	37,760	46,688	56,263
1947	35,700	35,500		3,570	3,570	7,159		32,130	32,130	43,970	47,546
1948	36,500	36,300		3,650	3,650	7,306		32,850	32,850	43,154	46,806
1949	43,300	43,100		4,330	4,330	8,661		38,970	38,970	40,479	44,809
1950	37,700	37,500		3,770	3,770	7,822		33,930	33,930	46,370	50,234
1951	42,700	42,500		4,270	4,270	8,540		38,430	38,430	42,066	46,336
1952	36,400	36,200	1,600	3,640	5,240	10,480	1,551	32,760	34,111	40,874	46,114
1953	38,600	38,400	2,655	4,003	6,658	13,316	6,283	29,434	35,717	42,663	49,321
1954	43,200	43,000	1,862	4,563	6,425	12,850	6,967	34,071	41,038	42,362	48,787
1955	38,300	38,100	1,166	3,417	4,583	9,166	7,138	35,475	42,613	43,049	47,632
1956	58,600	58,400	198	5,564	5,762	11,524	4,451	55,597	60,048	60,115	65,877
1957	37,500	37,300	697	4,394	5,091	10,182	16,517	24,017	40,534	45,348	50,439
1958	19,800	19,600	268	2,466	2,734	6,215	10,465	17,170	27,635	39,475	42,458
1959	82,800	82,600	82	7,568	7,650	15,462	5,998	56,266	62,264	63,758	71,462
1960	53,000	52,800	1,360	3,994	5,354	10,970	20,693	42,414	63,107	63,707	69,148
1961	66,400	66,200	98	5,506	5,604	11,317	14,146	53,219	67,365	67,719	73,359
1962	48,000d/										

(Continued on next page.)

APPENDIX TABLE 17--continued.

a/ Beginning July 1.

b/ For years 1949-1961, gross production less surplus disposal under federal marketing order and Section 32 programs.

c/ Blanks indicate no data available.

d/ Preliminary.

Sources:

Cols. 1 and 2: U. S. Bureau of Agricultural Economics, Tree Nuts: Acreage, Production, Farm Disposition, Value, and Utilization of Sales, 1909-45, 1947, pp. 3 and 11.

U. S. Agricultural Marketing Service, Tree Nuts, by States, 1949-55, Statistical Bulletin No. 195, 1956, p. 2.

U. S. Statistical Reporting Service, Tree Nuts, by States, 1954-59, Statistical Bulletin No. 295, 1961, p. 4.

Idem, Tree Nuts, by States, 1960 and 1961, 1962, p. 3.

Idem, Tree Nuts, by States, 1961 and 1962, 1963, p. 3.

Cols. 3 and 5-7: Almond Control Board, Sacramento, California (annual reports).

Cols. 4 and 8:

1939-1952: Estimated by the author on the basis of information on percentage of crop shelled contained in U. S. Tariff Commission, Edible Tree Nuts, War Changes in Industry Series, Report No. 18, 1946, 66p.; also U. S. Agricultural Marketing Service, Marketing Tree Nuts: Trends and Prospects, Marketing Research Report No. 139, 1956, pp. 12-13.

1953-1961: Almond Control Board, Sacramento, California (annual reports).

Col. 6: Column 5 converted to pounds plus in-shell imports from Appendix Table 14.

Col. 10: Column 9 plus shelled imports from Appendix Table 14.

Col. 11:

1920-1938: Column 1 converted to shelled equivalent at rate of 50 percent plus imports, shelled equivalent, from Appendix Table 14.

1939-1961: Column 9 plus column 5 converted to shelled equivalent at rate of 50 percent plus imports, shelled equivalent, from Appendix Table 14.

APPENDIX TABLE 18

Pecans: Production, Farm Sales, Utilization, and Total Available Supply, United States, 1920-1961

Crop year a/	Production			Farm sales			Utilization			Available supply		
	Total	Improved varieties	Wild or seedling	Total	Improved varieties	Wild or seedling	Marketed in-shell	Shelled commercially	Estimated shelled meats produced	In-shell	Shelled	Total, shelled equivalent
	1	2	3	4	5	6	7	8	9	10	11	12
	tons, in-shell basis						tons, in-shell basis		thousand pounds	thousand pounds		
1920	5,188	1,149	4,039	3,133	b/							5,016
1921	24,078	3,882	20,196	19,586								19,664
1922	5,678	1,724	3,954	3,189								5,724
1923	29,015	5,257	23,758	24,016								23,467
1924	18,999	3,575	15,424	14,625								16,346
1925	26,232	6,158	20,074	21,184								21,325
1926	47,931	8,768	39,163	42,069								38,757
1927	18,252	4,770	13,482	13,816								14,661
1928	34,275	9,003	25,273	28,095								27,751
1929	26,670	4,420	22,251	22,025								21,384
1930	28,568	6,938	21,630	23,603								23,051
1931	44,232	11,001	33,231	38,642								35,409
1932	34,117	5,907	28,211	29,305								27,295
1933	39,406	11,471	27,936	33,906								31,717
1934	28,086	9,734	18,352	23,234								22,616
1935	62,242	14,732	47,511	56,478								49,898
1936	29,894	16,129	13,765	25,009								23,977
1937	53,595	20,013	33,582	47,950	16,899	31,051						42,901
1938	37,162	17,646	19,516	31,962	14,790	17,172						29,809
1939	48,530	20,472	28,058	43,400	17,610	25,790	12,280	31,120	24,896	24,834	24,896	34,827
1940	61,442	21,063	40,379	56,040	18,033	38,007	12,790	43,250	34,600	25,603	34,600	44,841
1941	60,891	25,726	35,165	55,304	22,517	32,787	15,305	39,999	31,999	30,610	31,999	44,243
1942	38,687	22,692	15,996	33,762	19,749	14,013	13,655	20,107	16,086	27,323	16,089	27,018
1943	66,521	28,587	37,935	60,731	25,301	35,430	17,000	43,731	34,985	34,359	34,985	48,725
1944	71,052	30,594	40,458	65,266	27,369	37,897	16,421	48,845	39,076	33,200	39,076	52,353
1945	69,427	29,618	39,809	63,934	26,436	37,499	15,861	48,073	38,458	31,934	38,458	51,230
1946	38,113	16,746	21,367	34,180	14,588	19,593	8,752	25,428	20,342	17,662	20,699	27,763
1947	59,801	22,597	37,205	54,651	19,767	34,885	11,859	42,792	34,234	23,888	34,635	44,188
1948	88,022	38,766	49,256	82,077	35,319	46,758	14,827	67,250	53,800	29,654	53,838	65,700
1949	62,845	25,053	37,793	58,065	22,363	35,703	7,890	50,175	40,140	15,873	40,492	46,804
1950	62,315	31,394	30,921	57,454	28,513	28,941	10,584	46,870	37,496	21,191	38,139	46,613
1951	78,368	44,300	34,068	72,888	41,060	31,828	15,493	57,395	45,916	31,170	46,291	58,685
1952	75,718	39,785	35,933	70,938	36,995	33,943	11,728	59,210	47,368	23,621	47,585	56,967
1953	107,085	53,108	53,978	101,310	49,935	51,375	16,085	85,225	68,180	32,615	68,428	81,296
1954	47,300	21,900	25,400	43,430	19,980	23,450	6,320	37,110	29,688	12,640	30,109	35,178
1955	73,430	21,200	52,230	69,940	19,700	50,240	9,240	60,700	48,560	18,480	49,024	56,704
1956	86,890	53,155	33,695	82,080	50,525	31,555	11,680	70,400	56,320	24,292	56,567	65,962
1957	70,675	17,055	53,620	66,840	15,203	51,637	8,340	58,500	46,800	16,866	47,179	53,870
1958	85,725	52,150	33,575	81,275	49,780	31,495	13,763	67,513	54,010	27,664	54,392	65,450
1959	72,500	35,100	37,400	68,060	32,668	35,392	10,136	57,925	46,340	20,309	46,876	55,344
1960	93,750	40,110	53,640	88,225	37,305	50,920	14,723	73,503	58,802	29,490	59,269	71,219
1961	123,375	71,175	52,200	117,820	68,053	49,767	20,589	97,232	77,786	41,224	77,852	94,323

(Continued on next page.)

APPENDIX TABLE 18--continued.

a/ Beginning July 1.

b/ Blanks indicate no data available.

Sources:

Cols. 1-6: U. S. Bureau of Agricultural Economics, Tree Nuts: Acreage, Production, Farm Disposition, Value, and Utilization of Sales, 1909-45, 1947, p. 12.

U. S. Agricultural Marketing Service, Tree Nuts, by States, 1949-55, Statistical Bulletin No. 195, 1956, pp. 12-13.

U. S. Statistical Reporting Service, Tree Nuts, by States, 1954-59, Statistical Bulletin No. 295, 1961, p. 14.

Idem, Tree Nuts, by States, 1960 and 1961, 1962, pp. 6-7.

Cols. 7 and 8:

1939-1943: U. S. Tariff Commission, Edible Tree Nuts, War Changes in Industry Series, Report No. 18, 1946, 66p.

1944-1947: Estimated by the author using procedures specified in ibid.

1948-1961: U. S. Agricultural Marketing Service, op. cit., p. 6.

U. S. Statistical Reporting Service, Tree Nuts, by States, 1954-59, p. 8.

Idem, Tree Nuts, by States, 1960 and 1961, p. 8.

Col. 10: Column 7 plus in-shell imports from Appendix Table 14.

Col. 11: Column 8 plus shelled imports from Appendix Table 14.

Col. 12:

1920-1938: Column 1 multiplied by 0.8 plus imports, shelled equivalent, from Appendix Table 14.

1939-1961: Column 9 plus column 7 multiplied by 0.8 plus imports, shelled equivalent, from Appendix Table 14.

APPENDIX TABLE 19

Competitive Weights of Specified Shelled Tree Nuts with Shelled Walnuts

Use	Walnuts	Competitive weight[a]				
		Pecans	Almonds	Filberts	Cashews	Brazils
	percent	adjusted percentage				
		Prewar				
Baking	45	.180	.045	.225	.022	.068
Confectionery	35	.094	.245	.070	.018	.175
Salting	[b]					
Ice cream	5	.001				
Other	15	.016	.022	.008	.008	.015
Total	100	.291	.312	.303	.048	.258
Gross competitive weight[c]		1.000	1.072	1.041	.164	.887
		Postwar				
Baking	39	.172	.031	.111	.016	.066
Confectionery	11	.022	.070	.031	.007	.036
Salting						
Ice cream	4	.005	.002			
Households	39	.049	.039			
Other	7	.004				
Total	100	.250	.142	.142	.023	.102
Gross competitive weight[c]		1.000	.568	.568	.092	.408

a/ Calculated by multiplying distribution of competing nuts by corresponding distribution of walnuts as given in Table 12 of the text.

b/ Blanks indicate data not pertinent to walnut uses.

c/ Calculated by assigning a total competitive weight of 1.000 to pecans and converting total weights of other nuts to a comparable value.

Source: Table 12 of the text.

APPENDIX TABLE 20

Total and Per Capita Supply of Tree Nuts Other Than Walnuts
Shelled Equivalent, United States, 1920-1961

Year[a]	Total weighted shelled equivalent supply		Per capita total weighted shelled equivalent supply		
	Excluding pecans	Including pecans	Pecans	Other specified tree nuts	All specified tree nuts
	1	2	3	4	5
	thousand pounds		pounds per capita		
1920	40,125	45,141	b/		
1921	54,108	73,772			
1922	54,046	59,770			
1923	58,470	81,937			
1924	47,823	64,169	.143	.419	.562
1925	42,991	64,316	.184	.371	.555
1926	53,844	92,601	.330	.459	.789
1927	51,140	65,801	.123	.430	.553
1928	63,642	91,393	.230	.528	.758
1929	46,666	68,050	.176	.383	.559
1930	50,772	73,823	.187	.413	.600
1931	47,313	82,722	.285	.381	.667
1932	41,274	68,569	.219	.331	.549
1933	38,276	69,993	.253	.305	.557
1934	36,881	59,497	.179	.292	.471
1935	54,878	104,776	.392	.431	.823
1936	51,969	75,946	.187	.406	.593
1937	51,136	94,037	.333	.397	.730
1938	48,392	78,201	.230	.373	.602
1939	62,662	97,489	.266	.479	.745
1940	55,544	100,385	.339	.419	.758
1941	41,283	85,526	.331	.309	.640
1942	47,162	74,180	.201	.350	.551
1943	42,095	90,820	.361	.312	.672
1944	74,061	126,414	.391	.553	.944
1945	80,978	132,208	.384	.607	.991
1946	103,707	131,470	.197	.737	.934
1947	47,528	91,716	.307	.330	.637
1948	48,305	114,005	.448	.329	.777
1949	46,567	93,371	.313	.312	.625
1950	45,078	91,691	.307	.297	.604
1951	45,525	104,210	.381	.296	.677
1952	45,829	102,796	.364	.293	.657
1953	44,910	126,206	.511	.283	.794
1954	48,096	83,274	.217	.297	.514
1955	49,103	105,807	.344	.297	.641
1956	55,925	121,887	.392	.333	.725
1957	53,145	107,015	.315	.310	.625
1958	47,102	112,552	.376	.270	.646
1959	64,200	119,544	.312	.362	.675
1960	61,942	133,161	.396	.344	.740
1961	64,841	159,164	.515	.354	.869

(Continued on next page.)

APPENDIX TABLE 20--continued.

a/ Beginning July 1.

b/ Blanks indicate no data available.

Sources:

Cols. 1 and 2: Total supply, shelled equivalent, of each nut is from the following appendix tables.

	Appendix table	Column
Filberts	16	10
Almonds	17	11
Pecans	18	12
Brazils	14	12
Cashews	15	1
Pignolias	15	4
Pistachios	15	7

The total shelled equivalent of each nut was then weighted as follows for the periods 1920-1946 and 1947-1961.

	1920-1946	1947-1961
Filberts	1.041	0.568
Almonds	1.072	0.568
Pecans	1.000	1.000
Brazils	0.887	0.408
Cashews	0.164	0.092
Pignolias	0.164	0.092
Pistachios	0.887	0.408

The weighted supply of each nut was added to obtain the total weighted shelled equivalent supply.

Cols. 3-5: Total weighted shelled equivalent supply divided by United States total resident population from Appendix Table 21.

APPENDIX TABLE 21

United States Population, Income, and Price Indices, 1924-1962

Year	Resident population[a/]	Disposable personal income	Index of consumer prices (all items)	Disposable personal income (deflated)	Per capita disposable personal income (deflated)	Wholesale price index
	1	2	3	4	5	6
	thousands	billion dollars	1947-1949 = 100	billion dollars	dollars	1957-1959 = 100
1924	114,113	71.4	73.1	97.7	856	[b/]
1925	115,832	73.0	75.0	97.3	840	[b/]
1926	117,399	77.4	75.6	102.4	872	54.8
1927	119,038	77.4	74.2	104.3	876	52.3
1928	120,501	77.5	73.3	105.7	877	53.0
1929	121,770	83.1	73.3	113.4	931	52.1
1930	123,077	74.4	71.4	104.2	846	47.3
1931	124,040	63.8	65.0	98.2	791	39.9
1932	124,840	48.7	58.4	83.4	667	35.6
1933	125,579	45.7	55.3	82.6	657	36.1
1934	126,374	52.0	57.2	90.9	719	41.0
1935	127,250	58.3	58.7	99.3	780	43.8
1936	128,053	66.2	59.3	111.6	871	44.2
1937	128,825	71.0	61.4	115.6	896	47.2
1938	129,825	65.7	60.3	109.0	839	43.0
1939	130,880	70.4	59.4	118.5	904	42.2
1940	132,457	76.1	59.9	127.0	958	43.0
1941	133,669	93.0	62.9	147.9	1,105	47.8
1942	134,617	117.5	69.7	168.6	1,246	54.0
1943	135,107	133.5	74.0	180.4	1,314	56.5
1944	133,915	146.8	75.2	195.2	1,405	56.9
1945	133,434	150.7	76.9	195.6	1,392	57.9
1946	140,686	160.6	83.4	192.6	1,357	66.1
1947	144,083	170.1	95.5	178.1	1,231	81.2
1948	146,730	189.3	102.8	184.1	1,251	87.9
1949	149,304	189.7	101.8	186.3	1,244	83.5
1950	151,868	207.7	102.8	202.0	1,327	86.8
1951	153,982	227.5	111.0	205.0	1,324	96.7
1952	156,393	238.7	113.5	210.3	1,335	94.0
1953	158,956	252.5	114.4	220.7	1,378	92.7
1954	161,884	256.9	114.8	223.8	1,373	92.9
1955	165,069	274.4	114.5	239.6	1,444	93.2
1956	168,088	292.9	116.2	252.1	1,493	96.2
1957	171,187	308.8	120.2	256.9	1,494	99.0
1958	174,149	317.9	123.5	257.4	1,472	100.4
1959	177,135	337.3	124.6	270.7	1,522	100.6
1960	179,983	349.4	126.5	276.2	1,529	100.7
1961	183,043	363.6	127.8	284.5	1,548	100.3
1962	185,822	382.9	129.3	296.1	1,587	100.6

(Continued on next page.)

APPENDIX TABLE 21--continued.

a/ As of July 1.

b/ No data available.

Sources:

Col. 1: U. S. Bureau of the Census, Current Population Reports: Population Estimates, Series P-25, No. 250, July 3, 1962, p. 6.

Ibid., No. 264, April 12, 1963, p. 2.

Col. 2: Idem, Historical Statistics of the United States, Colonial Times to 1957, 1960, 789p.

Idem, Statistical Abstract of the United States, 1962, 1962, p. 318.

U. S. Office of Business Economics, Survey of Current Business, Vol. XLIII, No. 3 (March, 1963), p. S-2.

Col. 3: U. S. Bureau of the Census, Historical Statistics. . . .

Idem, Statistical Abstract . . . , p. 348.

U. S. Office of Business Economics, Survey of Current Business, Vol. XLI, No. 10 (October, 1961), p. S-7.

Ibid., Vol. XLII, No. 2 (February, 1962), p. S-7.

Ibid., Vol. XLIII, No. 2 (February, 1963), p. S-7.

Col. 4: Column 2 deflated with index of consumer prices (column 3).

Col. 5: Column 4 divided by column 1.

Col. 6: U. S. Bureau of the Census, Historical Statistics. . . .

Idem, Statistical Abstract . . . , p. 343.

U. S. Office of Business Economics, Survey of Current Business, Vol. XLII, No. 7 (July, 1962), p. S-8.

Ibid., Vol. XLIII, No. 3 (March, 1963), p. S-8.

APPENDIX TABLE 22

Data Employed in Analysis of Demand for and Imports of Shelled Walnuts, 1926-1942 and 1947-1961

Year[a]	U. S. per capita acquisitions of Pacific Coast shelled walnuts	Season average f.o.b. price of Pacific Coast shelled walnuts[b]	U. S. per capita imports of shelled walnuts from:			U. S. per capita acquisitions of in-shell walnuts	U. S. weighted supply of other tree nuts	Foreign commercial production of walnuts	U. S. per capita disposable income[e]
			Specified countries, excluding China[c]	China	Total[d]				
	1	2	3	4	5	6	7	8	9
	pounds	cents per pound	pounds			pounds		thousand tons	dollars
1926	.016	99.8	[f]		.178	.438	.789	--[g]	872
1927	.043	86.0			.133	.750	.553	--	876
1928	.023	85.8			.149	.527	.758	--	877
1929	.033	85.4			.138	.562	.559	--	931
1930	.019	96.2			.133	.464	.600	--	846
1931	.052	112.3	.047	.033	.088	.399	.667	107.0	791
1932	.040	93.8	.027	.014	.045	.478	.549	81.2	667
1933	.051	97.5	.014	.019	.044	.361	.557	75.4	657
1934	.069	81.7	.017	.024	.043	.434	.471	104.5	719
1935	.075	77.2	.010	.017	.029	.441	.823	93.7	780
1936	.082	76.9	.010	.029	.042	.433	.593	93.2	871
1937	.109	72.5	.008	.020	.031	.469	.730	105.3	896
1938	.108	82.3	.005	.024	.034	.452	.602	86.9	839
1939	.121	82.0	.006	.026	.033	.465	.745	79.4	904
1940	.134	81.6	.001	.033	.035	.449	.758	83.8	958
1941	.164	83.7			.014	.471	.640		1,105
1942	.154	76.3			.001	.598	.551		1,246

(Continued on next page.)

APPENDIX TABLE 22--continued.

Year[a]	U. S. per capita acquisitions of Pacific Coast shelled walnuts	Season average f.o.b. price of Pacific Coast shelled walnuts[b]	U. S. per capita imports of shelled walnuts from:			U. S. per capita acquisitions of in-shell walnuts	U. S. weighted supply of other tree nuts	Foreign commercial production of walnuts	U. S. per capita disposable income[e]
			Specified countries, excluding China[c]	China	Total[d]				
	1	2	3	4	5	6	7	8	9
	pounds	cents per pound	pounds			pounds		thousand tons	dollars
1947	.121	81.8			.002	.517	.637		1,231
1948	.108	80.9	.018	0	.018	.563	.777	52.9	1,251
1949	.119	78.7	.012	.029	.042	.534	.625	68.3	1,244
1950	.148	81.6	.035	.007	.044	.556	.604	57.6	1,327
1951	.129	67.6	.041	0	.043	.575	.677	76.8	1,324
1952	.135	73.4	.042	0	.045	.494	.657	79.4	1,335
1953	.132	82.2	.043	0	.045	.423	.794	63.3	1,378
1954	.159	72.4	.048	0	.050	.464	.514	71.1	1,373
1955	.135	106.6	.071	0	.072	.436	.641	91.5	1,444
1956	.148	68.8	.023	0	.024	.406	.725	79.6	1,493
1957	.157	78.9	.017	0	.019	.315	.625	53.0	1,494
1958	.188	69.4	.018	0	.019	.329	.646	86.3	1,472
1959	.191	78.5	.029	0	.030	.361	.675	71.1	1,522
1960	.160	85.6	.037	0	.039	.341	.740	88.7	1,529
1961	.160	78.6	.019	0	.020	.312	.869	76.2	1,548

(Continued on next page.)

APPENDIX TABLE 22--continued.

a/ Beginning August 1 except as noted in sources for columns 3, 4, and 7.

b/ Deflated with wholesale price index, 1957-1959 = 100.

c/ Sum of imports from countries specified in Appendix Table 4 except China, Canada, Spain, and "other."

d/ Not equal to the sum of columns 3 and 4 in several years because of exclusion of certain countries in data reported in column 3 and different construction of time series. See Appendix Tables 3 and 11.

e/ Deflated with consumer price index (all items), 1947-1949 = 100.

f/ Blanks indicate data excluded from analysis.

g/ Dashes indicate data either unavailable or incomplete.

Sources:

Cols. 1, 5, and 6: Appendix Table 12.

Col. 2: Appendix Tables 13 and 21.

Cols. 3 and 4: Calculated from data in Appendix Tables 4 and 21.

Col. 7: Appendix Table 20.

Col. 8: Appendix Table 1.

Col. 9: Appendix Table 21.

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